The Builder.

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Architects and the Volcano.

SOUTHERN Italy should be the paradise of architects. No country in the world can show nobler, more romantic, more lovely sites for palatial buildings. None can show worthier occupation of such sites. None possesses a greater variety and abundance of building materials. The traces of Roman grandeur still mark the buildings of to-day, for they, like the structures of Rome herself, must be built so as to resist the shock of an earthquake. For this reason, building south of the Alps is a serious occupation. No little pestilent rows of brick huts, like those that attend on the industry of our great manufacturing centres, spring up in the purlieus of Florence, of Turin, or of Naples. The duration of such houses as are now swelling the circumference of London would be at once certain and uncertain in Italy. It would be the latter, because no law has been discovered as to the periodicity of earthquakes. It would be the former, because they would exist only till the moment of the first shock. Such a wave as bowed the towers and belfries of Naples in 1858, causing in that city great terror though little damage, but overwhelming thirty thousand sufferers in Calabria, would, if it occurred in London, leave hardly a single building to be shaken by the *replica*, or dreaded return shock, always the most severe.

With the necessity of erecting substantial buildings arises the necessity for the employment of architects. The profession comes into daily requisition. The solid palaces which form the main buildings of the cities, and, to a great extent, of the country at large, are too important in the eyes of their owners to be left to the care of chance. They often need the eye of the expert. Built with the intention that they shall endure for at least a century without any very material repairs, it is yet certain that numerous works of a slight nature will be required within that term in order to maintain that durability. Hardly a single palace is to be seen without cracks, the significant autographs of the earthquake. The massive and noble palace of Caserta itself shows, in several places, a narrow vertical rent from roof to foundation. Immediate attention must be paid to each signal of danger, and this attention must be given under the direction of the family architect. No wonder that these gentlemen abound.

Again is Italy the home of the architect, because there he has the field to himself. He is not jostled unpleasantly by the engineer. The civil branch of that youthful and vigorous profession is unrepresented in that part of Europe. The only engineers there are those of the *Ponti e Strade*, the *Ponts et Chaussées*, the military officers answering to our own Corps of Royal Engineers. Their numbers are limited, and they very rarely interfere with the architect. It was to the latter that the construction of railways, when not carried on by foreign energy, was committed under the old regime. What a loss to the profession has been the result of the different course adopted in England! If the four hundred and ninety millions which the men of the school of Stephenson and of Brunel have laid out on our iron roads had only passed through the hands of English architects, what might not have been the result.

The Italian architects, then, constitute a numerous body of men, including members of high and cultivated talent, and exercising no slight influence on their contemporaries. In a sense unknown to ourselves, they are expected to exercise a constant vigilance, to care for the health of the buildings under their charge, as a family physician will attend to the health of his patients—not waiting for formal summons, or for positive malady to declare itself, but looking in ever and anon to suggest the timely one stitch that always saves the nine.

As they are thus expected to maintain that which is old, they are not unnaturally consulted as to that which is new, or which is to be in the future. In all cases in which the surplus capital of this country has been invited to fructify under the genial influence of the Italian climate it is the architect who has offered to the foreigner the rare and exceptional privilege of thus enriching himself. Plans of all kinds,—railways,—the progress of which nothing but the subtle and persistent treachery of successive Governments could have arrested,—ports and basins, roads through thickly populated but pathless districts, boulevards and arcades in the plethoric capitals, mines and factories, all these means of investment have been pressed upon the attention of Englishmen, who were supposed to have money to lay out under the authority of Italian architects. In most of these cases a simple division of labour was proposed: the English engineer or architect was to find the money, or to find the men who should find the money; the Italian would answer for the spending of it. From the canalisation of the Po to the restoration of the ancient port of Brindisi, as the land terminus of the Indian mail route, the same arrangement has been contemplated by the adroit *savoir faire* of our Italian friends.

Again, the Italian architect is eminently happy in the materials at his command. The people are born masons. If you are about to build, you have, in nine cases out of ten, only to sink down a few feet below the surface of the vineyard or garden in which you intend to erect your abode, to find an ample supply of tufa for your walls. This volcanic product, the agglomeration of the fallen products of long extinct volcanoes, resembles in its building properties the chalk of this country very closely indeed. It has not the purity of colour of white chalk, being of a grey, or drab, or violet tint when first exposed to the air; but it cuts very much after the manner of chalk, and it shares with that mineral the characteristic of forming reliable masonry, if protected from frost, or from soaking wet. We could point to many instances of chalk walling in this country, faced with brick, and thus forming economical and durable work.

Frost is a rare phenomenon in the south of Europe. Rarely more than two or three times in the course of the year is a slight scale thrown off from the surface of the tufa walls of the vineyards and gardens by its silent but irresistible agency. In buildings of any pretension to architectural importance, the tufa, which forms the mass of the structure, is protected from the injuries of the weather by brick or stone facing, or by the use of plaster or stucco. The Italian masons have peculiar facilities in the use of lime. As has been previously noticed in the pages of the *Builder*, the establishment of a lime-pit is always the first practical step taken towards the erection of a building. The unmixed but well-slacked lime remains for years under a slight film of water; and the readiness with which it yields its aid to the mason, the plasterer, the maker of *scagliola*, the beautiful artificial marble so common in the churches, or to the noisy services of the men who form the beaten floors, is perfect.

Not only the tufa, which thus forms the main substance of Italian masonry, but every other requisite of the mason, is readily to be met with in the districts to which we refer. Vesuvius himself, and many silent outlets of former volcanic fury, supply a hard and readily-worked stone, admirably suited to form the coigns, lintels, and jambs of domestic buildings, as well as to serve for a solid pavement to the streets. The *scala* limestones of the Apennines afford a finer, and not less durable, material, as well as sending chips and rough blocks to the lime-kiln. Volcanic sand is not rare, associated at times with the *lapilli*, or beds of small volcanic pebbles, that form a concrete capable of a finish so exquisite as to make a ready substratum for the art of the fresco painter. The most usual, and, with the sole exception of marble, the finest, floors for a mansion of importance, are of this material, which is beaten into place for a fortnight without intermission, and then carefully painted in figures. Marble itself is a native product, and, in the severe heat of the summer, the luxury which results from the introduction of a marble floor, or even of a marble staircase, is so great that a house supplied with these expensive fittings seems to be situated in a distinct and much cooler climate than the adjoining mansions, with staircases of lava, and beaten floors. Thus the architect, in these favoured regions, while his skill is constantly in request, has close under his hand an abundance of the finest materials fitted for the exercise of his ability.

Vesuvius, the symbol and concentrated expression of that force which shows its terrible energy in earthquakes, is thus a great friend, if not of architecture, yet at least of the architect. The best of friends, however, have their failings, and in this respect the fiery crater does not possess greater immunity from dangerous caprice than is common to human patrons. Very recently a disaster has occurred in the very heart of the city of Naples which people have not been slow to attribute to the activity of the volcano. If they are right in this opinion, it is far from improbable that very unpleasant proofs of the correctness of their views will be hereafter furnished from the same source.

Among the most striking and peculiar features of the neighbourhood of Naples, are the large buildings which, in several different directions crown the summit of lofty hills, often looking down a precipitous bluff on the water, or on the shore beneath their battlements. The old Angevin palace at Vico Equense, built by the brother of King Saint Louis of France, is a well-known instance. So is a monastery not very distant from that same palace, where the walls of the chapel seem so far to overhang the face of the lofty rock on which they stand, as to impress the passer-by with an instinctive dread; so very little seems necessary to cause church and cliff together to topple over into the blue waters of the bay. In the city of Naples, a hill some 250 ft. high, shuts out the "west end" from the centre of the town. This hill, precipitous towards the sea, is covered with buildings. One noble palace, recently restored on its crest, has its upper apartments, which are usually the principal rooms, ascended to by a series of marble staircases, containing 170 steps, and the view from this elevation is one of the wonders of the place. Nearer to the sea, and commanding a steep zig-zag ascent up the seaward bluff, stood a large monastery, now converted into a barrack. The face of the hill was covered with a revetment of masonry, at the foot of

which burrowed a small row of shops and dwelling-houses of a humble description.

It is now stated that it has been long matter of remark that this mountain was in an unsafe condition. Large fissures are said to have been visible in it from top to bottom. A year ago (but we must take the statement with the usual caution as to Italian *viva voce* evidence) the delegate of the quarter reported his opinion of the danger to the city architects, but investigation was deferred till "*domani mattina*," which, in that part of the world, generally falls on the Greek kalends. The attention of these gentlemen received a terrible call on the 28th of January, when the whole face of the hill came down without any further warning, burying the houses at its foot, and—it is even yet unknown how many—inmates and passengers. The alarm and excitement were naturally intense. By daylight the crowd on the spot was so dense that the troops were required to preserve order. The architects of the city were, of course, on the spot, and the expedient was adopted of appointing a commission to examine the mountain. That an immense deal of theory was ventilated on an occasion so favourable for the Italian love of speechifying, there can be little doubt. What rather shocks our less material minds is the fact that *for thirty-six hours*, while the impression was general that many wounded sufferers might yet be living under the *débris*, *nothing was done* to rescue them. A Venetian military engineer, whose name deserves record—Signor Zampari—endeavoured immediately on the occurrence of the catastrophe to commence a tunnel through the *débris*, in order to reach the site of the houses. His proceedings were suspended by authority. When this precious time had been lost, he was allowed to proceed, and worked incessantly for seventy hours, the city architects, of course, opposing so unprecedented a step. Another tunnel was driven towards the same spot beneath the level of the street itself, but with the lapse of time the human interest in the case vanished, and the spot gradually came to present only the usual features of work carried on for the Government in Italy—"sleepy men and half-grown *gamins* being engaged in carrying off the rubbish in small baskets." The entire want of energy and resource in a people that are far from being callous or unkindly, and through whom a sudden excitement runs like a shock of earthquake itself, is a mournful characteristic of the scene.

Whatever be our own national short-comings, and it must be confessed that the history of our public works has not been free from the occurrence of fatal accidents provoked by incredible carelessness or foolhardihood, there is one feature of our character of which we may be justly proud, and that is the manner in which every Englishman, by a common instinct, pulls off his coat in an emergency. Let him hear that life or limb is in peril, and he never dreads to share that peril if he can in any way hope to bring aid to the sufferers, or even to gain certain intelligence of their fate. By land and sea, in the coal-mine and in the life-boat, this unselfish and noble promptitude never fails at the call of danger. It is a characteristic that may even console us for the fact that our houses are not so habitually looked after by properly educated architects as is the case in the Italian cities.

The chief interest that now attaches to the scene of this calamity depends on the question whether we have had the last word of Vesuvius in the matter or not. The cause of the accident has been attributed either to the percolation and accumulation of rain behind the revetment, or to the gradual loosening of the face of the hill by the vibration attending that prolonged and splendid eruption of the volcano which has scarcely ceased. If the account given of the vertical fissures in the hill be true, there can have been no accumulation of water capable of producing the fall by hydrostatic pressure. The vibration from the Vesuvian shocks, though of the nature of earthquake, is far slighter than have been many of the actual earth-waves that from time to time pass over the whole country. In 1858, for instance, the whole shore for miles in circuit appeared to be permanently elevated some eight inches, as shown by the level of the waters in the bay. As it is the last straw that breaks the camel's back, so the last of a series of vibrations *may* have concluded an operation that had long been silently in progress. But it must be borne in mind that, in all cases, sharp bluffs mark centres or nodes of geological action. A sudden break of continuity, a contrast of elevating and of depressing forces, must have occurred beneath this exact spot at the distant time when the hill of Monte di Dio rose, or when the shores of Santa Lucia sank down. And just at the base of the mountain, giving certain indication of connexion of some kind with subterranean fire and energy, bubble warm and sulphureous springs. It is thus quite possible that what has been called a land-slip is, in fact, an indication of a direction of the volcanic force towards Naples itself. The city lies, as it were, between two fires,—Vesuvius to the south-east and Solfaterra to the north-west. Its position recalls forcibly to the traveller the aspect of Lisbon. The Tagus now rolls over the spot where, in the Great Earthquake of 1755, the quay, covered with human beings, sank suddenly to a fathomless depth. For a volcano to open in the Santa Lucia, close to that famous Castello d' Uovo, under the foundations whereof, according to the legendary derivation of the name, lies the egg on the security of which depends the salvation of Naples, would be a calamity neither without precedent nor without warning. It will be an immense relief to the Neapolitans if they can persuade themselves to cast the blame of their impotence on the supineness of the city architects rather than on the activity of Vesuvius.

Not foreign to the question of probable geological change in Italy is the intelligence recently received of a gradual but steady depression of the shore of the Lago di Garda. The physical state of Italy seems almost as feverish as its political condition.

ON THE UTILIZATION OF SEWAGE BY IRRIGATION.*

3. *Flat Flooding or Submersion.*

FLAT-FLOODING may be considered as a very modified form of catch-work irrigation. The land upon which it is used requires no other external conditions than those of being tolerably level and free from irregular depressions or elevations, and of just sufficient inclination to prevent the accumulation of sewage to any great extent. This is, perhaps, the cheapest form of irrigation practised, and where the object is rather to utilise the grosser impurities of sewage than to render it perfectly clear, it may be tried with moderate success. Great care is necessitated in the selection of the soil, which must be well drained, as this system has perhaps a greater tendency to stagnation than any other,—an evil which destroys vegetation, ruins the land, and is very detrimental to the surrounding atmosphere, rendering its locality, indeed, neither more nor less than a noisome swamp. The sewage enters on one side the inclosure by an overflowing conduit, and, after moving slowly over a very considerable extent of ground, is passed out at the other. There is no doubt that occasions may arise in which this method may be pursued with advantage, from its economy of cost and slight trouble; yet it must be understood that, to extract the utmost possible advantage from sewage irrigation, greater perfection of means must be used.

The mode of irrigation by submersion, as practised in Northern Italy and other countries bordering the Mediterranean, materially differs from the foregoing, which, as has been said, is simply catch-work in its most modified form. In the rice cultivation of these countries, the inclosure is completely circumscribed by light banks, with provision for admitting the sewage or manuring liquid, which is allowed to entirely submerge the land to a depth of several inches, where it is left to be wrought upon by evaporation and the absorbing properties of the soil. There is little doubt that the benefit to the crop derived from this method of utilisation is great, yet this benefit is almost counterbalanced by the prejudicial effect of the thick, unwholesome vapours exhaled by such stagnant and watery surfaces upon the health of the vicinity. Much might be done to mitigate this evil by good drainage, yet it must always exist more or less. Under our dull, watery sky, unfavourable to evaporation, and in the midst of our teeming population, this system would not be tolerated, even if it could be adapted to a suitable crop; whereas in the West of England the former method has been attended by good results.

4. *Sub-irrigation.*

By sub-irrigation, which is used to a limited extent in some parts of the Continent, is understood that mode of applying the sewage, not from the surface or from above the roots of the plant, but from below the surface, whence the liquid is drawn upwards by the capillary attraction of the soil particles.

Perforated or very porous drains are laid down, which from time to time are completely filled from the source of supply, and are stopped up, so that their contents shall have no other means of escape, save by the capillary action of the surrounding particles of soil, which are supposed to exercise this property chiefly in an upward direction. The construction of these drains is special, being laid very near the surface, inasmuch as the superior depth of ordinary drains would render them almost wholly useless for this purpose. But the very avoidance of this evil, by the construction of shallow drains, induces an alternative evil of scarcely less gravity—that of stagnation. To understand this clearly, it will be simply necessary to briefly remind the reader of the principles of common land-drainage.

Drains, which are laid down for the purpose of ridding a certain uppermost stratum of soil of its superabundant water, and rendering it dry, light, and porous, do not receive these waters in their downward descent from the surface: on the contrary, it is only after passing below them, and having thoroughly saturated the subsoil up to their level, that the water, rising upwards, flows into them, and is carried off. In all ordinary soils, therefore—that is, in soils which are not excessively absorptive—the horizontal plane defined by the position of the drains constitutes a distinct boundary between two conditions of soil; namely, soil in a productive state, free from superfluous moisture, and accessible to air; and soil in an unproductive state, crude, stagnant, and permeated with water. This indispensable result of drains is not, however, productive of harm in the case of those of ordinary depth; but when the shallow system of drainage required by sub-irrigation is used, a degree of permanent coldness and stagnation is induced near the surface, very injurious to the productive power of the soil. Nor is it attached to the double system of drains usually adopted in surface irrigation, since in this method both systems of drains are free outlets by which the drainage is speedily carried off, admirably adapted to keep the soil in its normal condition. Again, in very light, porous, and sandy soils,—perhaps the only soils upon which it would be possible to avoid the insuperable evil of stagnation, — the capillary attraction of the particles of earth above is not sufficient to counteract the gravitating tendency of sewage away from the roots of the plant, a result which would effectually destroy the chief end of sewage utilization, namely, profit. Further, it is well known that no manure can convey benefit to a crude, unworked soil, and the soil in immediate contact with any underground pipes, must necessarily partake of this crude nature; therefore under these conditions the application of sewage must be profitless.*

Fourthly, sewage matter gravitating through an unworked soil, such as subsoils invariably are, cannot be so effectually cleansed of its organic or inorganic impurities as sewage passed through a quickened soil.

Lastly, the periodical choking up of the pipes used in sub-irrigation is a defect which could hardly be avoided; even ordinary drains may be rendered useless by the accumulation of foreign substances entering through very minute interstices; and it will be scarcely thought that sub-irrigation will not be infinitely more liable to this annoyance. It may, therefore, be held, so far as our present experience of this method has proved, that as a means of utilising the sewage of towns, the system of subterranean irrigation is essentially wrong in principle and practically useless. As a means, however, of purifying sewage from much of the organic matter it contains by turning a large area into a vast natural filter-bed, this mode is worthy the attention of those who are sceptical as to the practicability of profitable utilisation under certain circumstances.

Sundry small experiments have been tried in sub-irrigation, but the author is not aware of a single instance in which in this country any practical benefit has accrued from it.

* See pp. 146, 168, and 202, *ante*.

* The difference between the subsoil and the arable surface soil, or the crude and the cultivated soil, supposing that both contain the same amount of nutritive substances, can only be founded upon this, that the cultivated ground contains the nutritive substances of plants, not only in a more uniform mixture, but also in another form."—Liebig's "Natural Laws of Husbandry," p. 64.

Dr. Thudichum's Plan.

The necessity for the separation of the liquid from the solid portions of the human excreta, and these again from the ordinary house and street refuse, which goes to form what is now universally understood as sewage, has been long and powerfully advocated by men whose opinion claims some degree of consideration, although hitherto no satisfactory plan has been evolved with this end. By the most of these advocates, there is one thing which appears to be too often lost sight of, to wit, the need of some means of dealing with the more dilute portion, after some other fashion than the collapsed methods of precipitation. It cannot be disputed that the collected voidings of human beings may, without extraordinary difficulty, be rendered into an excellent manure; but if it be proposed, as we have invariably seen it to be the case, practically to utilise this portion only, by what means is the crying nuisance of polluted streams and water-supply to be abated? It has already been explained that, independently of the contents of the water-closet, town sewage comprehends matter which, few will pretend to deny, ought not to be passed into running streams.* A thousand other ingredients of filth combine to swell the contents of the common sewer, which, under the present condition of things is discharged into the nearest stream. To effect the thorough cleansing of our water-courses is the one central object of all the vast agitation which has arisen in this regard of late years; and this—the all-important question—the method of separating the urine and fœces of human beings from the contents of the sewers, leaves, so far as can be gathered from the various schemes of the projectors, entirely undisturbed. Are we required then, while utilising this small portion, which may be regarded as a drop to the ocean of sewage, to abandon the great aim of utilisation?

It avails little to assert that after the closet refuse is abstracted from the sewer, the fouling of rivers will not go on as before. As well might it be said that the abstraction of the sewage of Woolwich and Greenwich from the Thames, would effect the purification of that vast volume into which the combined filth of the metropolis and a hundred other towns is being poured night and day. It has, indeed, been proposed to treat the remainder with lime with a view to precipitation; but after the experience which has been so dearly bought on this score, such a proposal can receive little credit. Another objectionable feature is the great cost necessitated by a two-fold system of drainage which at the same time does not effect the separation of the rainfall from the ordinary sewage.

Dr. Thudichum's proposition to the Metropolitan Board of Works for dealing with the London sewage is, to use his own words, "founded upon the discovery of a process by which a most valuable portable manure can, without difficulty, and at comparatively small expense, be produced from urine," and is in outline as follows:†—Pans are to be attached to water-closets, which ensure the urine and fœces being conducted separate and distinct, the one from the other. By this means the urine is to be brought to the sewers, through which it is proposed to conduct it by a system of pipes contained within the drains and sewers, main and intercepting, to the outfall at Barking Creek, there to be dealt with, and converted into a portable manure. In addition to the manure, the other component parts of the urine would, at a trifling additional expense, yield most valuable products; amongst others, purpurate of ammonia, or murexide, a magnificent purple dye, estimated by Dr. Thudichum to be worth 1,000*l.* per ton. In this way the product of the urine only would amount to the gross sum of 1,365,000*l.* per annum, or 10*s.* per head of the population.

The remaining portion of the sewage of the metropolis, consisting of surface water, street *débris*, fœcal and other matters, is, by this plan, to be conducted, as at present, through the sewers to Barking Creek, to be treated by the lime process, with a view to the utilisation of the product as manure.

Another proposition for dealing with the sewage of towns generally, from the same projector, was to dispose of the liquid voidings by uroducts, laid in main sewers, to be combined at suitable stations, or at the outfall, in tanks, and thence carried by road and rail. In conjunction with this mode of treating the urine, a system of deodorization by dry earth and paper bags was to be adopted for the fœces. The manifold advantages of the foregoing methods of dealing with this important question are enumerated with considerable force by their author, who is very severe upon those who assume "sewage" to be an "unalterable entity," and terms the water-closet "the most stupid of all inventions that ever interfered between man and his first duties." The author has, with the singular aid of his knowledge of the structure of the human form, built up a theory, which, however, has the disadvantage of being unillustrated from the practical basis of experimental proof.

When, therefore, Dr. Thudichum's theory is opposed to the experience of the past, and we are told, in the face of the most undoubted testimony to the contrary, that sewage contains nothing that is valuable for agriculture, or any other human purpose, beyond the excretions of men and animals, we may, without great violence to justice, suspect that he who tells us this speaks not as an impartial judge, but as a strongly-biassed advocate, who, with his own commodity in the market, lustily decries all other wares.

Separation of House Drainage from Rainfall.

By those who see in the extreme dilution of sewage in its present state, the chief objection to the economic utilization of its fertilising ingredients, it has been proposed to avoid such dilution by the construction of two separate and distinct systems of drainage. By one of these it is proposed to convey the rainfall alone, and by the other the household refuse, including fœcal matter. As, in the event of sewage irrigation becoming a chief means of utilization, this will be one of the most important and difficult questions affecting it, it may be expedient to enter into a short examination of the arguments for and against the adoption of this system of separation.

In designing a scheme of works for the utilization of sewage, under the combined system of rainfall and sewage, there is this indispensable feature, namely, the necessity for making provision in the construction of such works for the maximum rainfall of the district, in addition to the maximum flow of sewage proper. To effect this, there are three alternatives,—firstly, the undue flooding of the lands under irrigation; secondly, the construction of a by-wash, or storm overflow, by which the surplus waters shall pass into their natural outlet; and thirdly, the construction of a reservoir capable of storing the surplus. On the other hand, in laying out a scheme under the separation system, the flow of sewage is steady and unvarying, and the works may be constructed in accordance with the maximum consumption of water alone.

The arguments in favour of a separate and distinct set of sewers for the reception of the sewage proper are chiefly as follow:—First, the liquid being more concentrated in form is more easily manageable. When it is intended to pump sewage this is unquestionably an advantage, as it tends to lessen the cost of lifting. Instead of laying down pumping apparatus to correspond with the maximum rainfall and flow of sewage, or constructing huge storage reservoirs, the requisite power need only calculate upon the basis of water-supply.

Secondly.—Regularity of flow. No district, however favoured by nature, can at all times provide for the uniform distribution of storm-water, by the ordinary methods of irrigation, without heavy flooding. To avoid this, the construction of storm overflows becomes necessary, which must unavoidably cause a certain waste of the fertilising material, and in some measure affect the purity of the outlet stream.

Thirdly.—It has been stated that the extreme dilution of sewage caused by the rainfall materially diminishes the commercial value of the manurial ingredients it contains; that these may be more profitably applied in a stronger solution.

In favour of the combined system these arguments are met on almost equal terms. To the first, in respect of the cost of pumping, it is allowed that where no outlet by gravitation alone can be provided for the surplus or storm-waters, such cost must perforce be greater; but that there are few cases in which the well of the pump is placed so low as not to admit of an outlet. The power, therefore, need only be calculated on the basis of the ordinary rainfall and water supply. To the second, it is replied that the providing of the bye-wash aforesaid will obviate heavy flooding, and produce a degree of regularity in flow not inconsistent with profitable management; that such bye-wash, in sending storm-water down the water-course, does not send them in the form of sewage, but simply in that turbid condition which pertains to every stream during a period of heavy rain. That these joining a similar current, are borne rapidly away without the slightest ill effect. That if it be asked what becomes of those rich contents which a freshet is supposed to bring down a sewer, it is answered that the scourings of the sewer are the first results of the storm, and are retained by the grating at the outfall. To the third argument it is said, that as yet it is by no means definitely settled that the manurial elements of sewage would be productive of greater results in a less diluted form, in so far that, although there is a limit to dilution, the actual experience of sewage irrigation renders it doubtful whether such limit has been reached; and it is well known that water alone, judiciously applied all the year round, has a most beneficial effect upon the land. In fine, it is asserted, when the pith of these objections is extracted, they are found to amount to an allegation that, under the combined system of main drainage, perfection in utilization is not attained,—to which its advocates are prepared to submit.

In return, manifold objections are alleged against the adoption of the separation system.

In the first place, it is argued, our chief aim is to render our water supply as pure as possible. To do this, we must not only refrain from polluting it with house refuse and fœcal matter, but it is absolutely necessary that *all* the matters heretofore described shall be withheld. The thick, muddy impurities of the streets and courts of a large city, full of the dung of beasts and other animal matter, cannot be poured into a stream without injury to the water for all drinking and culinary purposes; and these constitute but a minor portion of the filth which, besides household drainage, sewage contains. Again, instead of forthwith easing the rates of communities, a double system of drains would add enormously to their already weighty burden; perhaps 50 per cent. on the original cost of sewering. In the third place, drains into which the watercloset refuse enters, but from which rain-waters are excluded, would require frequent flushing by artificial means; otherwise sediment would be deposited and silted up to the prejudice of the drainage flow. Lastly, gradients which are perfectly practicable where the rainfall goes to swell the volume of the sewage, would not suffice under this method; which, in a flat district, with slight fall, like Hull, would prove a formidable objection; and there are few towns without certain localities wherein all the skill and energies of the civil engineer are not taxed to maintain the sewers in a wholesome and efficient condition. On the whole then, it is said, it will be found that, whereas the advantages to be derived from this method are slight, its defects, on the contrary, are numerous and weighty enough to render the change inexpedient.

To decide upon this, the critical point in sewage irrigation is at present no easy task. The question at issue lies within a very small compass: is it expedient for the sake of certain contingent advantages, which have not as yet been sufficiently demonstrated by experience, to double, or nearly double, the entire system of main drainage in a town? A satisfactory solution cannot be derived until a just comparison of the net results in two parallel cases shall be within our power; one illustrating the combined system, and the other the separation system. There can be no doubt that circumstances may exist in which two distinct systems, communicating with each other, are advisable, and there are already instances in which some of our eminent engineers have proposed to adopt it.

Captain Liernur's Method.

The removal of human voidings and their attendant gases by means of the pressure of air, or pneumatic force, has recently attracted some attention on the Continent, more especially in the Netherlands, where it is, to some extent, in present operation. The chief exponent of this principle, Captain Liernur, whose views have been specially advocated in a late publication by a Dutch engineer,* proposes to dispose of the closet refuse of households by forcing it through pneumatic agency along certain subsidiary and

* Dr. Hawkesley stated at the Leamington Congress, 1863, "That the dry-earth system effectually relieves the towns of the necessity for sewers, but not of drains and conduits to carry off the rain-water and the water used for domestic purposes;" but he did not state by what means he proposed to deal with the contents of these.—*Leamington Congress Papers*, pp. 59, 60.

† Rep. Met. Sewage, 1864: App. 298, *et seq.*

* "The Sewage Question." By Frederick Charles Krepp. London. 1867.

main pipes into central tanks, fixed underground at the crossings of streets. These tanks, or, to speak plainly, cesspools, are of cast-iron, purporting to be so put together that all escape of gas or odour is prevented, as well as loss of percolation downwards, and are from time to time cleansed by the removal of their contents in carts or boxes to their final destination for agricultural purposes. What the advantages of this system may be over many others involving the cesspool principle, which have been rejected as impracticable, does not very plainly appear. Mr. Krepp, in the work above alluded to, expends much energy in denouncing cesspools as deadly and dangerous, and straightway proceeds to plead frankly for the construction of these iron "reservoirs" at the busiest points of public resort: in fine, to dot the town or district with cesspools on a grand scale. It is idle to talk of hermetically sealing these tanks; the gases invariably find egress at the joints, and rising to the outer air, whether palpably to the senses or not, are subtly absorbed into human lungs. Before the question of sewage utilization can be solved, this fallacious principle of hoarding up and concentrating in our very midst the pernicious exhalations of sewage must be utterly discarded. No time should be allowed for fermentation and putrefaction, but the source of danger should be hurried out of reach without delay, and dealt with by a form of deodorisation at once simple and beneficial.

The Land and the Crops.

The Land.—In the selection of the site for the utilization of sewage, much of the success which may attach to the enterprise depends upon the nature and condition of the soil to be treated. There is no doubt that in cases where it is stated to have been tried and failed, the want of success is due to want of judgment in this regard, coupled with injudicious application. It cannot be expected that stiff, unyielding, impervious soils, should make such a grateful return by this means of tillage as soils naturally dry, light, and porous, well-worked and pulverised, so as to render it greedy of the liquid manure. But, as what is necessary to complete the process of utilization is not only the absorption of the water by the soil, but the extraction by chemical affinity of the manurial properties contained therein, it would be a mistake to insist, as has often been done, that very loose gravelly, or pure sandy soils alone are adapted. Mr. Latham says,—"The purification of sewage is due to a very beautiful property possessed by all soils to a greater or less extent, and that is, the affinity the soils have of separating the fertilising matter from the sewage, and holding it until required by the plant. *Clay soils* have a much greater affinity for fertilising matter than pure sandy soils." Therefore, although less absorbent of moisture than sandy or gravelly soils, light, well-opened clays purify as effectually. Mr. Latham even goes so far as to say that "clay soils excel in production any other when treated with sewage."*

Nevertheless, it is considered by agriculturalists generally that sandy soils surpass all others in the proportionate benefit which they derive from the application of every kind of manure. Liebig says,† that, "in comparing a fruitful sandy soil, with an equally fruitful loam or marl, as regards the nutritive substances contained in them, we are surprised to find that the sand, with one-half, or even one-fourth of the total substances contained in the loam, will furnish an equally rich harvest. To understand this circumstance properly, we must remember that the nutrition of a plant depends less upon the quantity than upon the form of the nutriment in the soil, just in the same way as, for example, half an ounce of animal charcoal presents as large an acting surface as half a pound of wood charcoal. If the small quantity of nutritive substances in the sandy soil presents as large a surface for absorption as the larger quantity of those substances in the loam, the plants must thrive as well upon the former as upon the latter."

We must also recollect that the most prolonged and successful experiments in sewage irrigation have been conducted upon sandy soils, with results proportioned to the purity of the sand. The celebrated Craigentinney meadows at Edinburgh were originally of this nature, being, in fact, neither more nor less than seasand blown into *dunes* or hillocks by the wind. The experiment which is now being tried at Aldershott, with hopeful results, is upon the drifted white sand of Aldershott Heath—the most barren of soils. At Croydon the land consists of sand, with a subsoil of gravel, on the porous chalk formation; and very recently excellent results have been reported from the poor gravelly soil at Barking. On the other hand, the success of the application of sewage to the heavy clay at Norwood cannot be doubted; and at Rugby—where, however, the result has not been so decidedly favourable,—the land is on the lias formation. Mr. Lawes states that the soil most suitable for the application of sewage is the lightest that can be procured—a porous, sandy land.* Professor Way, before the select committee, said that he would select a pure sandy soil in preference to any approaching a clay, and that such a soil would become a light friable loam by the deposit of the suspended matters in sewage; at the same time endorsing Mr. Latham's theory, by adding that sand is inferior to clay in its retention of the materials of manure.†

It would appear, therefore, that experience has conclusively demonstrated that two totally different soils—clay and sand—are alike highly favourable to the utilization of sewage; the chief condition of success being a light, dry, workable state of the soil, whatsoever it may be. This being the case, we are justified in the opinion that sewage irrigation is adapted to every quality of soil.‡

M. P.

* Paper read before Society of Engineers, April 9, 1866.

† Natural Laws of Husbandry, p. 139.

* Rep. Met. Sewage, 1864: 4540.

† Rep. Met. Sewage, 1864: 4730, 4933-36.

‡ To be continued.

"THE HEALTH AND HAPPINESS QUESTION."

AN address, of which the following is an outline, was delivered in the Town-hall, Brighton, on Friday evening, the 20th instant, by Mr. George Godwin. The chair was occupied by Mr. Douglas Fox, and the hall was filled with an attentive audience:—

When I was invited by a commitee of gentlemen to say something to you about "Town Swamps and Social Bridges," the title of a little book, one of a series written by me several years ago, to set forth the condition of the metropolis and our large towns, I was at first strongly disposed to decline. My ordinary occupations are heavy, and, moreover, I feared that, after talking and writing of the subject for many years, I could say little that was fresh and would interest you. Learning more, however, of the views of the gentlemen who have organized these lectures, and being led to believe that some good might be done by even a weak word in season, I have willingly come to you, though at personal inconvenience, and I ask your kind and serious attention on the ground that the subject of my talk is of the extremest importance to every man, woman, and child in the kingdom, let their position in the social scale be what it may. The public health is a public question, and a matter of the deepest public interest. The well-being of the whole must depend on the well-being of the individual. When we call down Happiness on the head of our friend or benefactor, we put Health before it,—"Health and Happiness to you," is the cry,—and well we may do so. The rich man without health has little, the poor man has nothing.

As with the separate members so with the state as a whole. The state that is not healthy decays, and weakens, and perishes.

> "Ill fares the land to hastening ills a prey,
> Where wealth accumulates, and men decay."

And how have we shown our appreciation of this fact? By careful teaching and careful tending? by removing all adverse influences and guarding each bud of promise till it had reached an age of strength? On the contrary, by the most culpable indifference and the most profligate waste of energies and life. Men, women, and children are exposed, and expose themselves, to circumstances under which healthful life is impossible; under which decency and virtue are little less so. Much has been done of late years to render widely-known the simple fact that people cannot exist without air, and moreover that the air must be renewed; must be pure. It has been written and printed, and shouted, that air which has been breathed is no longer fitted to sustain life. Dip a lighted taper into a bottle and it will burn for some time, but fill the bottle with your breath and the taper when put in will be extinguished. The same gas that is needed to keep the taper alight is needed for respiration. Without oxygen the lamp of life also expires. You all know this; every one, we might suppose, knows this. Nevertheless, thousands and hundreds of thousands act constantly in direct violation of the requirement. An examination of the way in which human beings are herded together in towns shocks and startles.

"Overcrowding" means want of pure air; and want of pure air means debility, continued fever, death, widowhood, orphanage, pauperism, and money-loss to the living. It ought to be unnecessary now to give proof of its deadly doings: still, it may be well to recall the facts of the incident in the military hospital at Versailles, where for several years, in a certain month, being about a week after the arrival of the king at St. Cloud, there regularly occurred a fatal epidemic of typhoid fever among the soldiers. It never attacked the civil population, nor the officers. The cause was simply *overcrowding*. The garrison ordinarily consisted of about 500 men; but when the king came the number was increased to 1,200. The inmates were in consequence closely packed in small rooms, and fever and death came at once amongst them. The non-commissioned officers, better fed and never sleeping more than two in one room, escaped.

I have recently revisited a court in Drury-lane described by me several years ago. It is now nearly as bad as it was then. Every room is thickly occupied. The inhabitants are of the dangerous classes. Haggard and drunken women, with every trace of womanhood gone, are in the pathway; and there are swarms of children, some trained to begging, and others, it may be feared, to worse. In the majority of the houses the rooms are small, and the staircases are narrow and without ventilation. In two of the houses, 37 persons, I was told, lived in each, but it would probably be nearer truth to say that each house of 8 rooms contains on an average, including children, 40 persons; and as there are 21 houses, we have here 840 persons of the worst class pent up to their own destruction and the danger of the public. I will not distress you with any description of the condition of the inmates.

In a decent-looking house in Islington, occupied by workmen and others, I found that 9 persons slept in one of the rooms (12 ft. by 14 ft.), a father, mother, and 7 children. 11 shoemakers worked in the attics; and in each of the other five rooms there was a separate family. I could quote scores of such cases of overcrowding in what would seem to be decent houses, but the repetition might tire. No words, even aided by the pencil, can give a full idea of some of the dens which are occupied by a lower and different class: many born to evil, and without the power to rise; others the victims of more recent misfortunes or their own conduct. The world has still an interest in improving their condition: children as yet innocent cry aloud to be rescued from the otherwise inevitable gulf. In some places in the eastern districts quite recently visited I have found 11, and in three cases 14 persons occupying a single room. By the Sanitary Act of 1866 power is given to authorities to interfere and prevent such cases of overcrowding, but the difficulties in the way are found to be great and comparatively little has yet been done.

700 cubic feet is shown to be the smallest space, under ordinary arrangements, that will afford one person healthful sleeping-room. In apartments such as I have described, the occupants have not one-sixth of the required space. In hundreds of rooms that I have seen, each occupant had not more than 80 cubic feet! The drawings I now show you will give you some idea of these places.

Some of you may perhaps fail to see the connexion between overcrowding, evil structural arrangements, and disease. When, however, you find that in one part of a certain parish, for example, where the conditions are good, twelve die annually out of 1,000 living, while in another division of the same parish, where the conditions are such as I have described, twenty-eight die each year in 1,000, the connexion must surely be obvious. Some dwellings furnish a regular supply of fever cases, which supply stops when structural improvements are made. It may be affirmed that there are thousands of houses where health, decency, or virtue is scarcely possible.

When the difference effected in death-rate per thousand living is mentioned, it may not convey to all my hearers its full meaning. A few words will serve to make it more obvious. The annual death-rate to 1,000 persons living in London in 1867 was 23; in Manchester it was 31 to 1,000. If we call the population of Manchester 250,000, it will be seen that had the same rate prevailed as in London 2,000 fewer persons, under Providence, would have died there in the year. The fact that the death-rate of the small towns and country parishes was only 17 per 1,000 during the year, and that even there many conditions not favourable to health are allowed to exist, shows how much sanitary work remains to be done in the large towns. Lessening the death-rate of the metropolis by 1 in the 1,000 only, means saving about 3,000 lives *per annum*,—a very serious matter surely. The Act for regulating common lodging-houses has worked very well: fevers have ceased to infest them; and the manners, even, of those frequenting them, especially with reference to the provinces, are much improved. Similar good results will follow the exercise of proper supervision over other houses let to various families. The Act that gives the power was greatly opposed on the ground of interference with private rights and the inability of the poor to afford better lodgings; but as I ventured to urge in various directions at the time, a man is not permitted to knock on the head those who are dependent on him because he is poor; neither should he be allowed on that ground to kill them with bad air, and set up a fever-still for the benefit of his neighbours. "An Englishman's house is his castle," is a good saying; but, surely, it should not protect the ill-doer.

Typhoid fevers continue to be destructive of life, and that, too, not so much in the dwellings of the poor as in those of a higher class. It is clear to all who have well considered the subject, that these diseases result from the neglect of sanitary laws. The parish inspector, the medical officer of health, and the sanitary police have been at work in the courts and alleys, crowded back-slums, and common lodging-houses, and have effected great improvements in many quarters,—lessening the prevalence of disease. It is not too much to say that the inspection by competent persons (armed with certain powers) of the town and suburban dwellings, of all classes, indeed of dwellings in the country too, will be productive of the greatest advantage.

I should be glad to say something of the workplaces in which many thousands of young girls pass their lives and are destroyed; milliners, artificial-flower makers, feather-dressers, and others; but time will not permit.

To discover the cause of preventible illness in many cases is difficult; it needs technical knowledge in the observer. The close proximity of the cesspool and water-supply is the unsuspected cause of an immense amount of illness and death. Years ago I brought forward cases in proof of this, and the belief has been terribly confirmed more recently. The history of the Broad-street pump, Soho, afforded striking examples; as did the outbreak of fever at Terling, not yet stopped. [The speaker then gave some particulars of this disaster, and the lessons to be drawn from it.]

Some matters in our own houses call for notice from the Health point of view. As, for example, bad foundations, permitting dampness; thin and porous walls,—contributing to the same evil, and increasing the cost of firing; defective drains and traps; want of ventilation—supply of pure air and removal of bad; insufficient height of rooms; want of pure water; wasteful means of heating; smoky chimneys; want of light (dark rooms give a larger amount of sickness than light ones); and the defective paving of yards and areas. Never allow a trap to be open. Never close a fireplace. Evil is often produced by the damp site on which buildings are placed; and yet, at the present time, new streets may be seen where the scavengers are depositing liquid sweepings, masses of decomposing animal and vegetable refuse, and other abominations; and upon these, presently, the walls of houses will be raised, without the slightest arrangement to keep down the moisture, or prevent dangerous exhalations.

[At this point of his address, Mr. Godwin said he had seen some things that day in Brighton which had greatly shocked him; not because they were worse than might be found elsewhere, but because one expected to find in Brighton all the arrangements for perfect health: one expected to find in a place situated geographically and geologically like Brighton all that which would bring about a good state of things. One would not, he said, expect to find in such a town as this any health-destroying back-slums, or any small rooms filled with people without the possibility of air getting access to them. He then described the condition in which he had found Dorset-street, Thomas's-street, Derby-place, Pimlico, Claremont-street, Carlton-street, and Orange-row: in some cases badly drained, and in others ill supplied with water, although there was a good supply of the latter in other parts of the town. Improvements were most seriously wanted in these smaller districts of Brighton: the houses had no opening, no windows at the back; and the rooms were so small that persons were living where it was impossible to retain health; without which happiness was quite out of the question. He was glad to hear of the existence of the Brighton Sanitary Association, and the good it had done; and of the appointment of a medical officer of health. ("We haven't one.") "Then the sooner you get one the better," said the speaker; and he proceeded to state that what had been done had lessened the death-rate in Brighton from 25·8 in 1865 to 21·7, which meant that 300 persons were saved during the year. But the notion of finding a death-rate of 21 in 1,000 in a place like Brighton was simply preposterous. He had no desire to reflect upon the authorities; he knew the difficulties they had to contend with. But it was desirable they should know the effect the state of parts of the town had upon a stranger.]

I have already alluded to the effect upon the inmates of such dens as have been described. An assertion that I ventured to make some years ago, "*As the home, so the people*," is beginning to fix itself in the popular mind. It has been made the text of essays and the motto of associations. Widely admitted, it would be certain to produce good fruit. I have tried to add to this another:—

> To drain and pave,
> Means raise and save.

The connexion, perhaps, is not at once obvious, but it is, nevertheless, undeniable. Drainage alone will not do everything, but it is an important first step. There is evidence from Salisbury, Ely, and other towns that hundreds of lives have been saved by the improved drainage introduced.

As the education and the training, so are the children; as the children, so are the men and women. If we would have the sons of the struggling classes grow into orderly, sensible, and striving citizens, we must give them a road out of the slough, show them the value of order, and furnish them with weapons for the strife. Moreover, in a limited island-space such as that of Great Britain, the true greatness of the nation and its ability to sustain its poor could not but be vastly increased, were the foundations of life well and securely laid by improved arrangements promotive of health and vigour, so as to raise the stamina of its manhood to a high pitch. And it is not the improved condition of the matured man alone that would thus be realized: the fact that vigorous parents lead to a vigorous progeny is no less obvious; and thus the nation would improve, physically speaking, in an accelerated ratio, were more care and attention given to the rearing of infants. The condition in which thousands are now brought up is fearful to contemplate. The result is what might be expected. Beneath the feet of society exists an army of rough and desperate men and women, unsuspected and uncared for. They are to be counted in thousands. An execution or a local riot sometimes brings them into daylight and the streets; but at ordinary times they are to be found only where they live massed together, and under such conditions that improvement is impossible. From the vice-producing quarters to which I have referred, the prisons are supplied, and in these places the convict, when liberated from prison, finds his base of operations in continuing what he considers the business of his life.

Whatever is spent on education is saved twice over, and more, in prisons and police; to say nothing of the mighty saving of misery and life. This is pretty generally admitted. But we are very slow to act upon it. Some of the hinderances are found where one would scarcely expect to discover them. When all things are ripe for a large extension of the blessings of education, even Religion and Conscience step forward, and, with a resist-to-the-death expression, bar the way. Not that they are opposed to education; they have got beyond that after long reflection; they desire that education should be given, but it must be their own sort of education, and mixed up with their own menstruum.

And so neglected weeds grow apace, and instead of corn we get deadly-nightshade: instead of men and women with honest hearts and clear minds, we get "roughs;" and from roughs come burglars, garotters, and murderers.

The cost of crime is enormous; in fact, it cannot be counted. It operates in a hundred ways. The expense of the machinery towards punishment of crime alone amounted in 1866, according to judicial returns, to three millions.

Three millions sterling *per annum*, and this is not all. Another million, at least, should be added for the interest of money expended on buildings, the salaries of various officials, and items. And each year it becomes greater!

Convicts in England, according to returns, cost 34*l.* 7*s.* a head per annum. What do they cost the country when they are free? The number of the criminal population in England and Wales was computed in the year 1864-5 to be 145,000, and I believe this to be enormously under the mark. Including beggars and persons subsisting by other disgraceful means, the number has been calculated at 250,000. Let us, however, take the first to be the number, and say there are 145,000 persons, 117,000 of whom are at large, destroying instead of producing, living upon the industry of others,—taking from the community instead of giving to it. Would 50*l.* per annum a-piece be too much to put down as the loss caused by them to the community? No, nor enough, and yet at that sum we get nearly six millions to be added to the other four millions; or ten millions sterling a year, the cost of crime. If part of the cost of pauperism were added to this, as it might fairly be, the amount would be raised some millions more.

It is from such homes as we have contemplated that the ranks of the dangerous classes are recruited day by day. It is a disgrace to us that we should have such a class as "roughs;"—it means short-sighted parsimony and criminal neglect. The thousands of children running the streets of London and other places may be very nearly what we choose to make them. Humanity, Christianity, economy, self-interest, are all in favour of rendering them decent members of society. See that every child be awakened to a perception of the difference between good and evil, and receive the elements of knowledge. As the education and the training, so, I venture to repeat, are the children; as the children, so are the men and women. Improve the homes, raise the standard of health, and teach the children, and we shall soon cease to have "roughs,"—we shall soon lessen the numbers of the dangerous classes.

It would be a saving in money, a saving in misery beyond calculations, if the uncared-for Arabs of our streets were gathered up and sent, at the country's cost, to the best schools in Brighton. Children have been called the poetry of the earth; beams of light; and "living jewels dropp'd unstain'd from heaven."

> "Childhood is the bough where slumber'd
> Birds and blossoms many number'd."

If society get but a deformed and hurtful stump instead of a flowering, gladdening, good-giving tree, the blame and crime are society's own. Every child is a white page on which may be written good things; an impressible mass which waits to receive beautiful forms. The blame be on those who permit the page to be blurred, and the forms to be made repulsive. Children are the sacred trust of the State. The neglect of this trust—a great sin—brings its own great punishment. There is danger to the State in the increase of large masses of neglected poor; and these masses are supplied from the heaps of neglected children who survive the dangers they are exposed to.

It is of the utmost consequence that a knowledge of the laws which govern human life should be given to women. A frightful loss of infant life occurs through their want of this knowledge. The difference in the proportion of deaths amongst infants in various localities shows that this loss is unnecessary. Thousands of preventable deaths which occur, both in London and the provinces, from other than sanitary imperfections, are clearly to be traced to the ignorance of the mothers of the simplest principles of healthful management. In the schools in which the future mothers of the next race of English workmen are being educated, attention should be given to the instruction of the young, not only in sanitary matters, but as to the structure and

functions of the body. To the mothers we have to look for the education of the world. "When shall I begin the education of my child," said a young woman once to a wise man; "it is now four years old?" "Madam," he replied, "you have lost three years already. From the first smile that gleams over an infant's cheek, your opportunity begins."

Our workhouses, hospitals, manufactories, all need improvement. There are fairly-arranged hospitals on very bad sites: there are bad hospitals on comparatively good sites; but there is hardly an instance, in this country at least, of both hospital and site fully embodying those sanitary principles which are essentially necessary for the rapid recovery of the sick and maimed. Air of sufficient purity is not to be obtained in towns. Every existing town hospital ought, therefore, to be removed into the country, if it be possible to do so. At a moderate distance from towns land is much cheaper than in close-built places; and there are many large hospital establishments covering considerable areas of ground in crowded and valuable parts of towns and cities, which might be removed to the country not only with incalculable advantage to the sick, but with great pecuniary gain to the hospital establishment. Even in so vast a place as the metropolis, a few casualty wards, where accidents might temporarily be seen, rooms for the examination and the reception of cases, and suitable vehicles for transferring them to the country, would be all that would be necessary to effect the reform. A great mistake has been committed, as it seems to me, in the choice of a site for the new St. Thomas's Hospital.

The fundamental idea of all hospital plans ought to be this,—to have pure fresh air in every part of the building. Fresh air is the *sine quâ non*. Unless a building be so planned that the sick shall breathe air as fresh within its walls as they could do externally, they will suffer in a ratio corresponding to the degree of impurity. The infirmaries of many of the workhouses are in a most discreditable condition, and call for immediate improvement.

Do not be impatient of taxation for sanitary improvement. Illness pauperizes and demoralizes. Better sanitary arrangements would lessen poor-rates immensely.

A Bill is now before the House of Commons, brought in by Mr. McCullagh Torrens, which would give power to authorities to enforce the removal of houses dangerous to health and life, and enable them to afford facilities to societies willing to rebuild or re-arrange them in a fitting manner. It is to be hoped that it will become law.

Repeating an observation I have made elsewhere, I would say, in conclusion, that it is scarcely possible to estimate the amount of misery, remorse, and crime produced by unhealthy houses. Apart, however, from the avoidance of extreme evils—sickness and death—a home should be a place of repose, cheerfulness, and comfort, where the worker may gain fresh strength and energy for the daily struggle. Dulness, gloom, apathy, ill-temper, will not produce this. We all know what trifling matters will change a career, and that the misery of a life may be born of a chance observation. The connexion of these remarks with our subject will be seen at once. Amidst bad domestic influences the spirits flag, the temper changes. Breathing bad air, suffering from the effect of damp, the world looks dark, the heart is heavy; cheerful effort is out of the question; kindly companionship is withered; and jangle and snarl take the place of mutual encouragement and healthful converse, which develop the affections and powers. The occupants of such houses as we are contemplating do not *live*; they only pass their time—and a very bad time it not seldom is. Life, which should be a blessing, is often made a curse by an unhealthy house and its consequence—an ill-ordered home. Besides remedies of evils referred to, we want also more colour in our houses, pictures, flowers, and a garden; the effect of these on the spirits, and so on the health, the thoughts, and the habits, is greater than some imagine; and the same argument will apply in calling for the well-ordering and proper adornment of towns.

To ensure the largest amount of general happiness, let us do our best to promote the general health. And this, after all, is not wholly unselfish; for happiness, it has been said, is a perfume that you cannot shed over another without a few drops falling on yourself.

At the close of the address the chairman (Mr. Fox), Mr. Thorncroft (assistant overseer), Dr. Fussell, and others, in very interesting speeches expressed their entire concurrence in the remarks of the speaker. Mr. Councillor Davey, chairman of the Sanitary Committee, stated the desire of the Corporation to render the town healthy in every respect. A vote of thanks, moved by Mr. Henry Willett (who in the course of an able address, said he had hoped to see more of the clergy present), was given to Mr. Godwin, who thanked his audience, and moved a vote of thanks to the chairman, which terminated the proceedings.

EXCAVATIONS ON THE PALATINE.

AFTER the preamble on the earlier undertakings in the search for antiquities on the Palatine, we may take a brief review of what has hitherto been achieved within the Farnese grounds by the works ordered by the French emperor, and under the direction of Signor Rosa. We cannot attempt to support all the theories advanced by that learned gentleman, as the inscriptions on posts, like sign-boards, indicate according to his conclusions respecting every ruin and every site. In most instances there is little or nothing in the ruins extant to announce their character, save in respect to the magnificence of marble decorations, attested by the fragments of cornices, friezes, pavement, and statuary; but what meets the eye, at the first glance, is an extent of low substructures, interspersed with a few loftier piles of brickwork, a few vaulted chambers, some broken but erect columns, and great variety of such marble *débris* as manifest the former splendours of halls or porticoes now roofless. The more picturesque and imposing ruin-masses stand in the gardens not comprised within the French property, where the totality of hitherto excavated remains has rather, indeed, the appearance of a vast ground-plan, traced in lines of brickwork, and more or less occupied in every part by the remnants saved from past grandeur, than that of an excavation presenting any unity of design or architectonic effect. It is evident that the Cæsars, one after another, successively destroyed, or at least disregarded, the erections of their predecessors; the buildings of one being contradicted by or sacrificed to those of another, without regard to the symmetric character of the whole; and in many instances, more ancient—some, indeed, very richly-adorned—structures being reduced to mere foundation-works for the support of the imperial chambers raised above. Thus the vaulted halls, to which we descended at some depth, and which were long erroneously designated "Baths of Livia" (see *Corinne*), attest by the beautiful decoration of their ceilings, in fresco-painting and gilt stucco-relief, an origin certainly aristocratic, as the style was manifestly palatial in these interiors, left for ages inaccessible, since their sacrifice to more important buildings raised above them, but now totally vanished. Those chambers, judging from the art-works they contain, may be referred to about the time of Augustus, certainly not earlier, and are now, though subterranean, seen by daylight; their decorations having much suffered, owing to the admission of air and rain. They evidently belong to a suite, the entrances and other parts of which are recognizable; and the deep vertical channels along the walls, for woodwork, as apparent, gave rise to the popular error respecting the imaginary "Baths." We may begin, however, from the approach to the terraces in front of the villa built by Pope Paul III., a pleasant residence looking east and westward. An extent of lofty halls still retaining their roofs, divided into parallel suites, quite irregular in scale and plan, are entered from the lower level, southwards, below the elevated site of that villa: nothing could be more dismal than those interiors, the inner range of which can never have received natural light save through the doorways communicating with the outer. It is probable they are the buildings of Caligula, or the structures forming a new front above the Via Sacra, raised by Vespasian after he had destroyed the greatest portion of the vast Neronian palace. Farther to the south opens a wide recently-excavated area, along one side of which ascends a steep road, with its massive ancient pavement, and recognised as the *Via Nova*; the ascent at this point, as the *Summa Novæ Viæ*, of which historians speak, leading to the *Porta Mugonia*, one of the three (or, according to some writers, four) gateways in the walls of the city ascribed to Romulus. To our right, as we follow this road, rises from the hollow an enormous mass of concrete, or rubble work, propped up in the lower part by brick and hewn stone work, manifestly of very ancient date, and which Signor Rosa identifies with the terrace-substructure that supported the temple of Jupiter Stator, vowed by Romulus before the battle with Latius (Liv., i., 12), and rebuilt in fulfilment of another vow by Attilius Regulus, Consul, according to his engagement, self-imposed, before the Samnite war (Liv., x., 36-7), this restored temple having stood from A.U.C. 458 to A.D. 65, in which year it was destroyed by the fire under Nero. Arrived at the summit of the ancient way, past the site of the Porta Mugonia, we reach a vast extent of roofless buildings extending to the western ridge of the hill, and supposed the palace of the Flavian emperors, begun by Vespasian, continued by Titus and Domitian, with the character of which period in art the rich decorations, here found in marble fragments, well accords. Among these quadrangular buildings is a peristyle, once surrounded with columns, and evidently rich in decorative details, supposed the *Cœnatio Sicilia*, where Pertinax was surprised by the Prætorian guards on the day of his death. Another is styled (we quote from the sign-boards) *Jovis Cœnatio*; another, *Tablinum*; another, *Ædes Publica*, as the edifice thrown open to the citizens by Nerva (Pliny, *Panegyr. Traian*), and one of the smaller interiors is recognised as the *Lararium* by its altar still erect, with reliefs of religious ministers. Rich and varied are the decorations in the larger halls, the friezes, cornices, graceful candelabra of white marble, and intarsio pavements in geometric patterns, filled up with porphyry, serpentine, giallo antico, &c. Here and there we see portions of incrustation, showing a correspondent surface of coloured marbles, particularly the Numidian *giallo*, on the now low-reduced walls. Some mutilated busts of good style are seen, among other such relics, on pilasters thrown up for their display. At the western ridge of the hill extends a series of terraces, which appear to have been reached by steps, leading probably to a portico, that may have served for contemplating the spectacles in the Circus Maximus, that lies below.

The character of one interior, as a basilica, with its semicircular recess for the tribune, remnants of a marble screen in front, and also of the columns that divided its area into three aisles, is sufficiently evident, and justifies the conclusion that this may be the Basilica Jovis mentioned in the Acts of two martyrs, Silvester and Lawrence, who suffered A.D. 264; and further westward we enter a roofless court, designated *Nymphorum*, with an ample elliptical structure for a fountain, in two stories, the higher surrounded by niches, once adorned (we may suppose) with sculpture, the lower with a broad channel; some portions of massive fluted columns, of giallo antico, remaining here to attest the richness of architectural details at the pleasant spot where Cæsars and their empresses may have whiled away the hours of summer-heat. Beyond this range of hills, westward, rises a restored colonnade, Corinthian, with shafts, in Carystian marble monoliths, on bases here found, immediately below which, on the further side, we look down into an abyss, where a monument of imposing character, and evidently high antiquity, meets the astonished gazer,—two lofty interiors, divided by a rectilinear wall, built in square-hewn blocks of lithoid tufa, the masonry like that of the Tabularium in the capitol, and supposed referrible to about the same date, within the century before our era, or about the period of Sylla (138-78 B.C.), the origin and purpose of this solid structure being now pure matter of conjecture, though we must certainly assume some edifice for public uses, as well as the singular fact of its being reduced to a mere cellar, or foundation, for the support of later buildings. Beyond extends an area with fine intarsio pavement, supposed a library; and further, immediately at the brow of the hill, another roofless interior, surrounded with a ruinous circle of terraces rising stepwise, which Rosa designates as an academy or hall for declamations, where classic poets may have recited their verse to imperial and courtier audiences. North-eastward from this point we descry another ample terrace, the site, no doubt, of some conspicuous building that stood in the centre, on a lofty basement of concrete, supported by buttress walls of peperina stone, with several portions of fluted shafts, in the same stone, and other architectural fragments, ar-

ranged for view upon the spacious level, here being recognisable the stylobate of a temple, which Rosa identifies with that to Jupiter Victor, vowed by Fabius Maximus during the third Samnite war (Liv., x., 29), and which stood from the year of Rome 459 till at least as late as the close of the fourth century, being mentioned by the Regionaries. The festival of Jupiter Victor, held on the Ides of April, is described by Ovid in the "Fasti," l. iv. We must turn back in the direction whence we started, to visit, at a point nearly central, a long walled corridor, evidently subterranean from the first, now, indeed, almost totally deprived of its ceiling, which we see was covered with coloured mosaics, representing birds and other ornamental designs in compartments,—a building supposed to be of the time of Tiberius, and to have served for private communication between different wings of the palatial residence; some noticeable detail here—the restoration, in coarse, careless work, of the original black and white mosaic pavement—leading us to infer a comparatively late appropriation of this corridor. It is apparent, and especially at this point, that the Palatine was divided by a wall into two portions; the height to the south called *Summa Velia*; that to the north, *Germalis*; the imperial building having long concealed this natural formation; and Tiberius's covered way serves to unite the two, or rather the edifices overlooking that valley from opposite terraces. Here, too, was found a plain massive altar, circular, with a shell-like cavity at the summit, and dedication, inscribed in large letters by the *pontifex*, Cneius Domitius Calvinus, a personage conspicuous in the wars between Cæsar and Pompey. Further northwards we reach the *Auguratorium*, assumed site of the Augurs' College, which was restored by Hadrian, now reduced, in fact, to little else than an apparently natural mound, with terrace-summit shaded by ilex trees. An epigraph, relating to that college, was found near this spot (see Gruter's series) confirmatory of its local claims. And from this point we overlook a long extent of low vaulted chambers, all on the same plan, and with the rudest species of black and white mosaic for pavement, referred to the buildings of Tiberius,—perhaps the ground-floor story inhabited by slaves in that emperor's addition to the Augustan Palace. As we skirt the hill side, westward and northward, our attention may be distracted from things near to the beauty of nature and of the distant city views, the Jovicular height, the winding Tiber, the Trastevere quarter, the Capitol, and the Forum, with many of the monuments that attract all Europe to those historic sites; but the most striking group of imperial ruins is that which suddenly spreads before us on our arrival at the north-eastern angle of the Palatine, overlooking the Forum, or, rather, its southern purlieus. Here we find ourselves in the upper story of two vast systems of building, divided into lofty vaulted halls ranged parallel, and only lighted from the entirely open side by which each is entered, the two stories being utterly without accordance in plan and symmetry in design, even the partition walls failing to coincide; the higher and more recent having been built without regard to the lower story—and here, as so often observable elsewhere among the Palatine ruins, one emperor's work precisely answering to the purpose of spoiling, in effect at least, that of another. It is the great wing added by Cajus Caligula, who first extended the imperial buildings to this side above the Forum, that we recognise in the lower structure; that of Nero, raised above and absorbing his predecessor's works, in the upper. Some remains of painting, two groups of figures, and stucco reliefs, in panels, on the vaulting (the latter, in the lower halls, particularly graceful), remind us of Pompeian art, and may well be ascribed to the Neronian period.

These gloomy halls seem to penetrate into the heart of the hill, range within range, the innermost, in some instances, lighted by orifices at the roof, but for the most part in darkness only dispelled by the faint light struggling for entrance through doorways from outer chambers. In those where daylight prevails have been erected the few sculptures, busts, and other fragments here found, on antique pilasters. Portions of a marble grating have been placed along the edge of a terrace that traverses the higher story, and which, we are told, is no other than the bridge ordered by the insane Caligula to communicate between his palace and the Temple of Jupiter in the Capitol. The ominous gloom of these imperial halls, now rather like cavernous excavations than the abodes of sovereign grandeur, accords well with the darkest memories and most horror-striking deeds that cast their shadows over the story of guilty despotism in Rome. Along the ground-floor, near the north-eastern angle of the hill, extends for some distance the ancient pavement of the *Clivus Victorine* that passed through a gateway, *Porta Romana*, one of those in the primitive Romulean walls, now represented by a restoration in brickwork of the imperial period. Returning to the villa of Paul III., we observe on the platform before its western front the lower part of a round chamber, called *balneum*, and probably one of the bath-rooms in Caligula's palace. Not far off is a pile of brick ruins, quite isolated, long supposed the sole remnant of Augustus's Palatine library, as seems confirmed by the discovery, in digging beneath that spot, of columns in precious marble and fragments of colossal statues in basalt (see Burgess's notice of these made in 1720); and, farther to the south, near the limits of the Farnese estate, Rosa places the Temple of Palatine Apollo, some portion of the stairs before whose front he has seen (as he tells us), beneath the road that ascends towards the Convent of S. Bonaventura, from the arch of Titus. We may be sceptical before such designations, on the placards put up by the learned director, as the "staircase of Cacus," the palace "where Tanaquilla addressed the people from a window after the death of Tarquinius Priscus" (Liv., i., 41); the site of the house of Cicero, on the slopes overlooking the Via Sacra, may be admitted; but when we are required to believe that on a grassy platform, north-westward, stood the "*Tugurium Faustuli*," or cottage, where Romulus passed his childhood, we may ask whether modern Roman antiquarians can to this day persist in ignoring the school of Niebuhr, and all the attainments of thought and research due to the impulse given by that historian?

Before leaving we should visit the museum of sculptures and other antiques found in the course of these works, now occupying an outhouse of the villa, most noticeable among its contents being the casts from originals already taken to Paris of a torso, one of the many replicas, from the celebrated Faun of Praxitiles, and of another figure (little more than a torso), of a winged Cupid, with quiver and bow, the latter object inferrible, but no longer seen; also some expressive busts, and a graceful draped female figure, probably a Venus, still left in the marble original; besides coins, lamps, glasses, and every species of coloured marble, alabasters, &c., in the profusion found in so many similar Roman collections. We should advise the visitor to choose for Palatine rambles the hours near sunset of an autumn or spring evening, when the effects of light and shade among these labyrinths of ruin, and the solemn beauty imparted by the hour to monument and mountain, to city and landscape, seen from these grounds, cannot fail to impress and delight,—to remain in memory among the unforgetable things of Rome.

Rome.

THE MUNICIPAL OFFICES OF LIVERPOOL.

IN our last volume* we published some descriptive particulars of the large building which has been erected by the Corporation of Liverpool with the object of concentrating all the various municipal establishments, which have hitherto been scattered over the town, to the serious inconvenience of the public. We now give an elevation of the building and the two principal plans.

We may repeat that the building is a quadrangle, comprising about 4,800 square yards. The style is Corinthianesque, treated freely, the capitals being composed from English ferns instead of the acanthus. The height of the building to the upper cornice is about 60 ft., and to the roof of the pavilion between 80 ft. and 90 ft. A tower, about 200 ft. in height, rises from the centre of the front.

The cost of the building, without land or furniture, has been about 100,000*l.*

The contractors were, for the brick-work, Messrs. Holme & Nicol; stone-work, Messrs. Parker & Son; carpentry and joinery, Messrs. Haigh & Co.; plastering, Mr. Jones; plumbing, Mr. Crellin; warming and ventilating, Messrs. H. Price & Co.; bells, Messrs. Warner & Sons; clock, Messrs. Penlington & Hutton; &c.

* Vol. xxv., p. 819.

The building was begun from the plans of Mr. John Weightman; but has been almost entirely carried out by his successor, Mr. E. R. Robson, the present architect to the Corporation.

The building is occupied; but the spire is not yet wholly completed.

The following references show the appropriation of the various apartments:—

Basement.

Under rooms, ground floor, Nos. 1 to 5. Treasurer's store-rooms.
Under Nos. 7, 8. Joiners' shop.
" 9, 10, 11, 12. Town-clerk's store-room.
" 19, 20, 21, 22, 23, 24. Water engineer's store-room, &c.
" 14, 15, 16, 17. Licensing Department.
" 26. Arcade entrance to basement.
" 27, 28, 29, 30. Gas-testing department.
" 34 and 35. Nuisance department, outside inspector's office.
" 37. Scavenging department, outside inspector's office.
Central portion of basement used for stores and lumber.

Ground Plan.

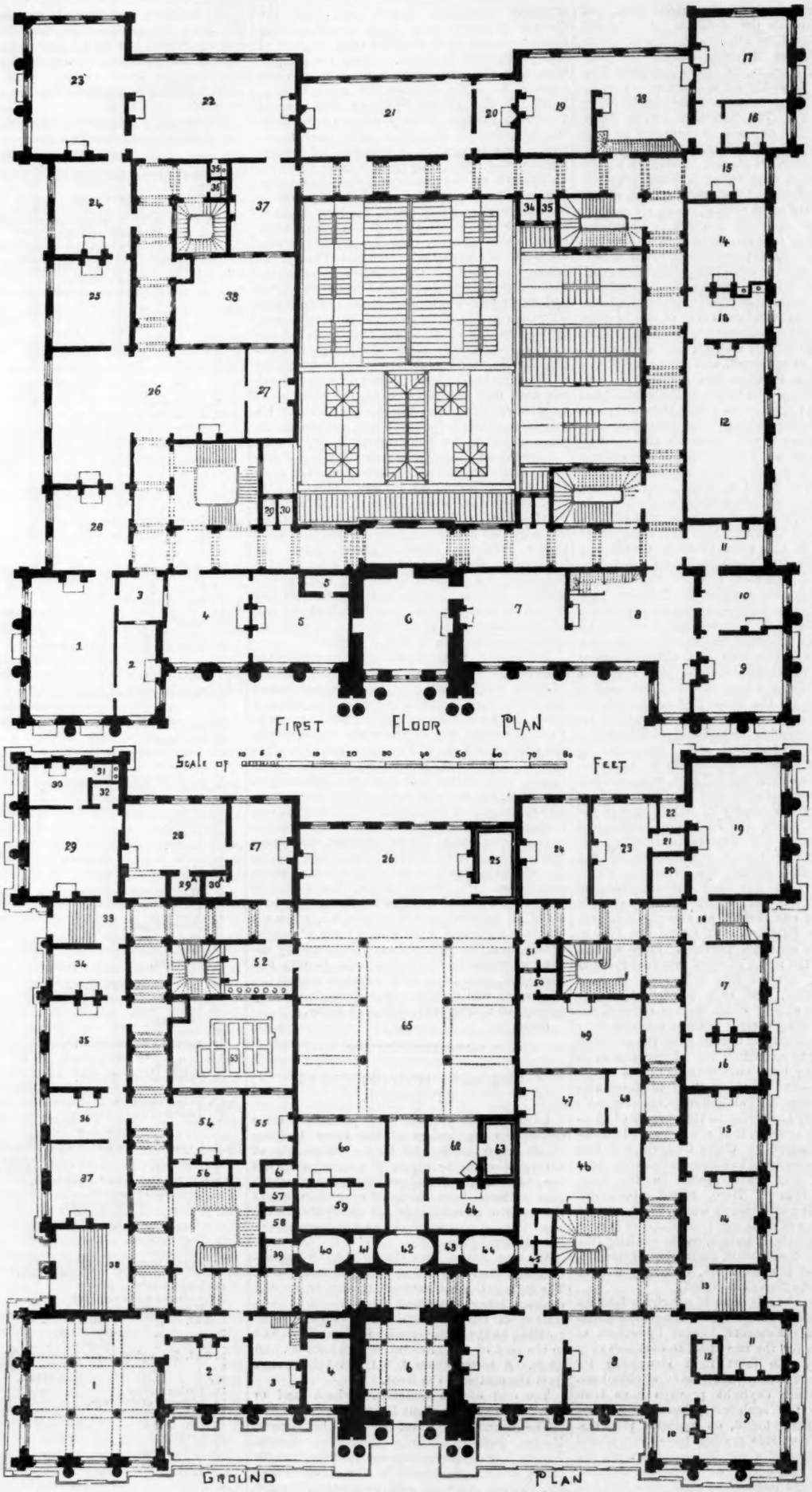
No. 1. Borough treasurer's public office.
2. " " private office.
3. " " retiring office.
4. " " strong-room.
5. " " safe.
6. Entrance-hall.
7. Finance committee-room.
8. Town-clerk's clerks' office.
9. " private office.
10. " waiting-room.
11. Compensation clerk.
12. Safe.
13. Entrance.
14. Deputy borough solicitor's clerk.
15. " " office.
16. Deputy prosecuting solicitor.
17. " " " clerk.
18. Entrance.
19. Law stationer's clerks.
20. Strong-room.
21. Safe.
22. Lavatory.
23. Deputy registrar's clerks.
24. " " and water committee-room.
25. Strong-room.
26. Treasurer's office for extra writing clerks.
27. Inspector of nuisance's private office.
28. " " general office.
29a. " " safe.
30. " " safe.
29. Inspector of Scavengers' public office.
30. " " private office.
31. " " lavatory.
32. Safe.
33. Entrance.
34. Chief inspector of health.
35. Inspector of lodging-houses.
36. Clerk's private office.
37. Medical officer's private room.
38. Entrance.
39. W.C.
40. Lobby.
41. W.C.
42. Lobby.
43. W.C.
44. Lobby.
45. W.C.
46. Watch committee-room.
47. Sub-committee-room.
48. Vestibule.
49. Health committee-room.
50. W.C.
51. W.C.
52. Lavatory.
53. Area.
54. Smoke inspector's office.
55. Messengers.
56. Strong-room.
57. Lavatory.
58. Area.
59. Auditor's private office.
60. " clerks.
61. Lavatory.
62. Treasurer's chief clerk.
63. Strong-room.
64. Debenture-room.
65. Treasurer's public office.

First-floor Plan.

No. 1. Deputy building surveyor's general office.
2. " " " plan-room.
3. " " " vestibule.
4 & 5. Rent collectors' department.
6. Architect's plan-room.
7 & 8. " drawing offices.
9. " private office.
10. Compensation clerk.
11. Waiting-room.
12. Deed-room.
13. Deputy town-clerk's chief clerk.
14. " " private office.
15. Waiting-room.
16. Assistant water engineer.
17. Water engineer.
18 & 19. " general office.
20. " chief clerk.
21. " public office.
22 & 23. Borough engineer's drawing office.
24. " private office.
25. " chief clerk.
26. Paving clerks.
27. Surveyor of drainage.
28. Deputy engineer.
29 to 34. W.C.s
35. Lavatory.
36. W.C.
37. Plan-room.
38. Area.

Second Floor.

Above rent collectors' department, keeper's room.
Above architect's department, drawing-office for ditto.
Above water engineer's department, drawing-office for the same.
Borough engineer's department, drawing-office for ditto.



THE MUNICIPAL OFFICES, LIVERPOOL.

THE MUNICIPAL OFFICES, LIVERPOOL.——MR. E. R. ROBSON, AND THE LATE MR. JOHN WEIGHTMAN, ARCHITECTS.

"SHARROW CHURCH."

THE architects of this handsome church are Messrs. Blackmoor & Mitchell-Withers. In connexion with the illustrations of it published in our last we gave the name of Mr. Mitchell-Withers alone.

THE STAGE.

Royal Princess's Theatre.—The revival of Mr. Boucicault's version of "Jeanie Deans," has proved quite successful. The trial scene is as effective as ever, the adapter appearing as the *Counsel for the defence*, and the firing of the Tolbooth at the close was so real, that some of the theatrical critics present on the first night expressed their belief that the intention was to burn down the house and get rid of them all at a blow, or rather a burn. Mrs. Boucicault as *Jeanie Deans*, touches the hearts of her audience more than once; and Mr. Leeson makes a quaint *Dumbiedikes*. Mr. J. G. Shore (*Argyll*), Miss Litton (*Effie Deans*), and Mrs. Chas. Harcourt (*Meg Murdochson*) deserve a word of praise.

St. George's Opera-House.—Mr. German Reed's season terminates on (this) Saturday evening, March the 28th. We must congratulate Mr. Reed on the success of it. His endeavours will, we hope, lead to the permanent establishment of English opera under his spirited direction. Madlle. Liebhart's engagement was a capital move.

THE UNIVERSITIES AND ART-TEACHING, BY AN ARTIST.

ONE of the advantages of public discussion consists in obtaining individual experience and conviction, for where so many conflicting interests and opinions exist, education may be compared to a figure not only having many sides, but like one of those cut crystals which glitter at every angle, so lucid and imaginative that the mind's eye is dazzled by its contemplation.

As an artist, it is natural that I should look at the question in an artist's point of view, and I am fully aware that people are as easily apt to be led away by their pursuits as by their feelings.

Education is a work of the *mind*, mind in the abstract having no material existence visible to the human eye. A substance must be given to thought—an image (so to speak) to the intellect—before it can be made transferable, just as a Bank of England note which, in itself, possesses no intrinsic worth, is the representative of solid metal.

There are only two ways of doing this, viz., by the language of *form* and *words*. A *thing* speaks for itself—is a recognised fact—the surest record of its own integrity—an acknowledged testimony of a truth—a mirror to the mind.

On the other hand, "a man may possess all the tongues which Babel cleft, but if he have not a knowledge of *the solid things* contained in them, as well as the words or lexicons, he is no more to be esteemed a learned man than a yeoman or tradesman completely wise in his own mother dialect."

Why education should be so exclusively conducted as an affair of books, no reasonable cause can be assigned; for words, in themselves, either in their structure or likeness, convey no idea of things; and to attempt to educate people only through books is like trying to squeeze a kilderkin into a half-pint measure. Books cannot alone contain education; and it is a question, more especially in the exercise of the industrial arts, worthy of consideration, how much the world has gained by the invention of printing, in so far as the *solid things* are concerned.

If the ancients were worshippers of wood and stone, in the present day we are idolators of words. Ancient mind is revealed in form as well as letters. Phidias and Socrates, the two greatest men of almost any age, were by profession both sculptors, as well as priests and philosophers. Each died in prison, a martyr to his mission—the elevation of mankind.

In the language of form, Wisdom was represented springing, fully armed, out of the head of Jove, and placed on the Acropolis, as the presiding Deity of Athens. In words, "Wisdom," says Solomon, "is the image of God"—each an example in its own way, an expression of mind. Taking, however, still higher, the highest ground, for revealing the most sublime and sacred truths, God himself bears testimony of Himself in like manner; for "as words are the image of our intellect," even so was Christ "the express image of God. He was begotten of the Father, even as our words are the children of our intellect." "The word was made flesh."—"This is my body," &c., &c.

And yet, with all this clear evidence, both Divine and human, of a great necessity, the language of form is not even recognized, or its most simple and elementary principles taught in our schools or universities, otherwise than as a mere accomplishment; whereas, on the Continent, large provision for education in art, as an essential accompaniment to all intellectual cultivation, is made, not only in the more professional schools, but in every school, and of every grade, each in proportion to its grade and object. In the elementary school, the purely people's school, elementary drawing fitted for the people's purposes is taught. In the district provincial secondary school this preliminary instruction is further developed. In the college and university, whilst opportunity is given for its manual cultivation, a higher object is aimed at—the philosophy on which it rests, and by which it is regulated, both intrinsically and in its relations to the other departments of human thought and action, is pursued. There is scarcely a university without its regular chair of æsthetics, its gallery of casts, drawings, and engravings, as well as library, to which the student can refer from the pages of his author for illustration whenever he needs. It is something to study antiquity in this double mirror,—one day dwelling on the fatal fortunes of Laocöon and his sons, in the impassioned lines of Virgil, and the next pursuing and completing the poem in the still more powerful production of the statuary. Our classical education is not a knowledge of its antiquity; it is scarcely a knowledge of its classics: they know the language of words, but they do not know the language of form; they leave out one-half of ancient mind. It is not by mere mechanisms of versification the solid things can be appreciated, or as a philosophic graphic expression of the general intellectual and moral elements of the age and country.

Without such accompanying inquiries, no one can understand Homer or Virgil as Homer or Virgil ought to be understood; it is not merely to understand, but to appreciate, both through philology and art. The spirit is not less written in the Venus, Laocöon, Apollo, the Elgin and Egina marbles, than in the pages of Hesiod, Homer, or Horace.

Æschylus, and Sophocles, and Euripides have no nobler — nay, truer — commentary, more steeped in their own spirit, more thoroughly, more accurately themselves, than the myths of those splendid vases, which are the admiration of mankind, and without their aid it is vain to hope to reach, through the language, the literature, much less the general mind, of a country.

Science undoubtedly has accomplished great things to redeem other shortcomings; but it must be remembered that the greatest men of eminence have been self-educated. Their school has been the universe, their Creator the guide; they found "tongues in trees, books in the running brooks, sermons in stones, and good in everything." They derived their knowledge from observation and the exercise of those faculties (as well as by the use of those *senses as instruments*) in acquiring knowledge which are not recognized in our curriculum.

Genius is the gift of God; it is an affair of great moment in what manner its growth is sustained, and any mistake on this point is *fatal*. I have seen a child of four years old draw a Bantam cock flapping its wings without difficulty, and a full-grown man unable to imitate a pill-box without suffering as much agony in the attempt as though he had swallowed the contents.

"There is a vigilance of observation, and an accuracy of distinction, which neither rules nor precepts teach." By the exercise of this faculty, the first link in that long chain of discovery was the fact (which to many minds would seem trifling and unimportant) of Galvani's discovery of the convulsion of a dead frog, which chanced to lie near an electrical machine while a spark passed from it, and he examined the precise circumstance under which the convulsion took place. One of the persons also concerned in modern electrical researches was a youth, my pupil, William Jenkins, whose discovery of a shock from a single voltaic pair of plates formed the occasion and subject of Faraday's ninth series of Experimental Researches; and this branch of modern discovery is not of mere theoretical interest, but has culminated in such practical applications as the Atlantic Telegraph, which has influenced the intercourse of nations, affected the fate of empires, connected the Old World with the New, and been instrumental in giving happiness as well as employment to millions of people.

It is the office of genius to open ever fresh combinations and resources, for the exercise of national industry, whilst upholding the greatness of a country, equalising labour and capital, keeping pace with the times.

Surely, if university extension means anything, besides conferring degrees and the abolition of tests, it might recognise *mind* in art as well as literature, for, "like twin cherries, they grow on the same stem." It is not by attaching D.C.L. to a name, or ceremonial observances, and conventional ornamentations, or picture-making (which is the business of an artist). This important movement can be effectually accomplished but by founding an art school, where the *language of form* can be initiated, and requiring the same degree of efficiency in the examinations as, at least, on a level with philosophy, Latin, and Greek; and no just reason can be given for a neglect which is a source of such grievous consequences, in every way, to the whole community.

The prosperity of the country is vested in our educational institutions. The university is the precedent, being the representative of mind and intellect. Education in these days means not only religion and virtue, but a right application of knowledge to the wants of the people.

WILLIAM RIVIERE.

GARTH STONE FOR LONDON.

EVERY ONE who has paid attention to the subject of building materials in the metropolis must have arrived at the knowledge of two broad facts; first, that stucco, as now used, is the standing reproach of London architecture; and, secondly, that the efforts to introduce stone into our public buildings have been attended with more signal failure and disappointment than any other great city in Europe can have experienced in that respect.

The inquiry would be long which would lead to a correct knowledge of the causes that operate to produce this state of things: they are, doubtless, to be traced partly to commercial, partly to natural influences. Meanwhile the difficulty remains; our public taste is impugned, and the durability of our edifices compromised.

Lately we have examined some specimens of a remarkably fine sandstone, from the millstone grit formation, near the mouth of the Vale of Llangollen, North Wales. This stone is not a new discovery, and it seems strange that, attention having been once called to it, no efforts have been made to render it subservient to a requirement of the metropolis, which points precisely in its direction; and at a moment when so many large public works are either on hand, or just about to be commenced, it seems to be a matter of great importance that the claims of such a building material should be strongly tested.

In 1861 a committee was appointed by Government to inquire into the state of the Houses of Parliament, and to suggest a remedy for the decay of the stone in that structure. In the minutes of evidence attached to the report made by this committee, we find Mr. Burnell (himself a member of the committee) saying,—

"Perhaps, going a little beyond the immediate subject before us, I may mention that in the course of this week I was sent down purposely to examine the series of formations which are represented on that table,—the millstone grits,—and I may be allowed to express my regret that we in England do not with that class of material, which we have so easily at hand, employ, as the French engineers and architects do, those harder and more lasting materials' The millstone grits to which I refer are those of the North Wales formation, near Ruabon, called the Garth stone, close to the canal and close by the railway."

Mr. Tite, M.P., the chairman of this committee, appears to have followed up the suggestion, for we remember that he produced at the Metropolitan Board of Works a specimen from one of the quarries referred to; and, after stating that the price per foot cube in London would be about 2s., gave his authority to the statement that it would be equal for all the purposes required for the Thames Embankment to the granite, which at the time was with difficulty obtained at more than double that price. Indeed, as to the qualities of the stone they almost speak for themselves. It is one of the purest sandstones, in which the grains of quartz are cemented

together by a silicious cement almost as indestructible as the quartz itself, and if evidence were wanted to prove its power of resistance to atmospheric influences, the Abbey of Vale Crucis and the Bridge over the Dee at Llangollen, both built of this stone, present themselves to show how little effect has been produced upon it by many centuries of weathering in a mountain district.

We add part of a report by Mr. T. W. Keates, F.C.S., upon a sample of the stone sent to him for examination:—

"This stone is compact and uniform in texture. Its specific gravity is 2·120, consequently the weight per cubic foot is 132·5 lb.; the ton weight measuring 16·9 cubic feet.

The composition of the stone is as follows, per cent.:—

Silica	86·10
Carbonate of lime	·40
Alumina	4·20
Oxide of iron	8·00
Moisture	·07
	98·77

The iron is partly in the form of carbonate which makes up for the loss."

Here is a material which we are quite disposed to think may be advantageously used in the metropolis,—a material which may help to make London a city of stone instead of stucco; and it seems to us that those who have the command of the carriage of this or the like material, from whatever part of the country it may be obtainable, have a great responsibility if, by excessive demands for freight, they deprive themselves of our London market and the public at large of the great benefit of a supply of this article of stone at a price that may compete with that of a less enduring and a less desirable material.

FARADAY AS A DISCOVERER.*

AN interesting and graceful memoir of Faraday as a discoverer has been written by his able successor and personal friend, Dr. Tyndall, whose knowledge of the philosopher and the man was complete, and enabled him to do full justice to his subject in every sense. We have all heard much of Faraday's gentleness, and sweetness, and tenderness, says Dr. Tyndall; and it is all true; but it is very incomplete: you cannot resolve a powerful nature into these elements; and Faraday's character would have been less admirable than it was had it not embraced forces and tendencies to which the silky adjectives "gentle" and "tender" would by no means apply. Underneath his sweetness and gentleness was the heat of a volcano. He was a man of excitable and fiery nature; but through high self-discipline he had converted the fire into a central glow and motive power of life, instead of permitting it to waste itself in useless passion. "He that is slow to anger," saith the sage, "is greater than the mighty: and he that ruleth his own spirit than he that taketh a city." Faraday was *not* slow to anger, but he completely ruled his own spirit; and thus, though he took no cities, he captivated all hearts.

Faraday, as his biographer elsewhere remarks, was more than a philosopher: he was a prophet; and often wrought by an inspiration to be understood by sympathy alone. The prophetic element in his character occasionally coloured, and even injured, the utterance of the man of science; but, subtracting that element, though you might have conferred on him intellectual symmetry, you would have destroyed his motive-force.

His experiments were always suggested and guided by his theoretic preconceptions. His mind was full of hopes and hypotheses, but he always brought them to an experimental test. The record of his planned and executed experiments would, Dr. Tyndall does not doubt, show a high ratio of hopes disappointed to hopes fulfilled; but every case of fulfilment abolished all memory of defeat: disappointment was swallowed up in victory. In dealing with his hypotheses he incessantly took them down, as an architect removes the scaffolding when the edifice is complete. "I cannot but doubt," he says, "that he who, as a mere philosopher, has most power of penetrating the secrets of nature, *and guessing by hypothesis* at her mode of working, will also be most careful, for his own safe progress and that of others, to distinguish the knowledge which consists of assumption,—by which I mean theory and hypothesis,—from that which is the knowledge of facts and laws." Faraday himself, in fact, was always "guessing by hypothesis," and making theoretic divination the stepping-stone to his experimental results.

When, from an Alpine height, the eye of the climber ranges over the mountains, he finds that for the most part they resolve themselves into distinct groups, each consisting of a dominant mass surrounded by peaks of lesser elevation. The power which lifted the mightier eminences, in nearly all cases lifted others to an almost equal height. And so it is with the discoveries of Faraday. As a general rule, the dominant result does not stand alone, but forms the culminating point of a vast and varied mass of inquiry. In this way, round about his great discovery of Magneto-electric Induction, other weighty labours group themselves. His investigations on the Extra Current; on the Polar and other Condition of Diamagnetic Bodies; on Lines of Magnetic Force, their definite character and distribution; on the employment of the Induced Magneto-electric Current as a measure and test of Magnetic Action; on the Revulsive Phenomena of the magnetic field, are all, notwithstanding the diversity of title, researches in the domain of magneto-electric induction.

Faraday's second group of researches and discoveries embrace the chemical phenomena of the current. The dominant result here is the great law of definite Electro-chemical Decomposition, around which are massed various researches on Electro-chemical Conduction, and on Electrolysis, both with the Machine and with the Pile. To this group also belong his analysis of the Contact Theory, his inquiries as to the Source of Voltaic Electricity, and his final development of the Chemical Theory of the pile.

His third great discovery is the Magnetization of Light, which Dr. Tyndall likens to the Weisshorn among mountains,—high, beautiful, and alone.

The dominant result of his fourth group of researches is the discovery of Diamagnetism, announced in his memoir as the Magnetic Condition of all Matter, round which are grouped his inquiries on the Magnetism of Flame and Gases; on Magnecrystallic Action; and on Atmospheric Magnetism in its relations to the annual and diurnal variation of the needle, the full significance of which is still to be shown.

These are Faraday's most massive discoveries, and upon them his fame must mainly rest; but even without them sufficient would remain to secure for him a high and lasting scientific reputation. We should still have his researches on the Liquefaction of Gases; on Frictional Electricity; on the Electricity of the Gymnotus; on the source of Power in the Hydro-electric machine (the two last investigations being untouched in the foregoing memoir); on Electro-magnetic rotations; on Regelation; all his more purely Chemical Researches, including his discovery of Benzol. Besides these he published a multitude of minor papers, most of which, in some way or other, illustrate his genius.

"Taking him for all and all [concludes his biographer], I think it will be conceded that Michael Faraday was the greatest experimental philosopher the world has ever seen; and I will add the opinion, that the progress of future research will tend, not to dim or to diminish, but to enhance and glorify the labours of this mighty investigator."

The self-devotion of Faraday as a philosopher,—he disliked to be called a physicist, and always spoke of himself by preference as a philosopher,—was most disinterested and admirable. At a certain period of his career he was forced, as he said, definitely to ask himself, and finally to decide, whether he should make wealth *or* science *the* pursuit of his life, as he could not serve both masters, and was therefore compelled to choose between them. After the discovery of magneto-electricity his fame was so noised abroad that the commercial world would hardly have considered any remuneration too high for the aid of abilities like his. Even before he became so famous, he had done a little "professional business." This was the phrase he applied to his purely commercial work. His friend, Richard Phillips, for example, had induced him to undertake a number of analyses, which produced, in the year 1830, an addition to his income of more than 1,000*l.*; and in 1831, a still greater addition. He had only to will it to raise in 1832 his professional business income to 5,000*l.* a year. Indeed, this is a wholly insufficient estimate of what he might, with ease, have realized annually during the last thirty years of his life.

"While restudying the Experimental Researches with reference to the present memoir [says Dr. Tyndall], I sought to ascertain the period when the question, 'wealth or science,' had presented itself with such emphasis to his mind. I fixed upon the year 1831 or 1832, for it seemed beyond the range of human power to pursue science as he had done during the subsequent years, and to pursue commercial work at the same time. To test this conclusion I asked permission to see his accounts, and on my own responsibility, I will state the result. In 1832, his professional business income, instead of rising to 5,000*l.*, or more, fell from 1,090*l.* 4*s.* to 155*l.* 9*s.* From this it fell with slight oscillations to 92*l.* in 1837, and to zero in 1838. Between 1839 and 1845, it never, except in one instance, exceeded 22*l.*; being for the most part much under this. The exceptional year referred to was that in which he and Sir Charles Lyell were engaged by Government to write a report on the Haswell Colliery explosion, and then his business income rose to 112*l.* From the end of 1845 to the day of his death, Faraday's annual professional business income was exactly zero!"

Taking the duration of his life into account, this son of a blacksmith and apprentice to a bookbinder had to decide between a fortune of 150,000*l.* on the one side, and his undowered science on the other. He chose the latter, and died a poor man. But his was the glory of holding aloft among the nations the scientific name of England for a period of forty years.

The outward and visible signs of fame were also of less account to him than to most men. He had been loaded with scientific honours from all parts of the world. Without, probably, a dissentient voice, he was regarded as the prince of the physical investigators of the present age. The highest scientific position in this country he had, however, never filled. He declined to accept the chair of the Royal Society.

* Faraday as a Discoverer. By John Tyndall. London: Longmans, Green, & Co.

PROFESSOR LEVI ON "OUR WORKMEN."

A LECTURE has been delivered in the Temperance-hall, Townhead-street, Sheffield, in connection with the Sheffield Chamber of Industry, by Professor Leone Levi, F.S.A., London, on "Our Workmen, their Labour, Rewards, and Trials." The Mayor occupied the chair. The lecture was a very able one. In alluding to the national influence of the working classes, the lecturer said: Collectively, the working classes exercise considerable influence on the welfare of the nation. Their income on the aggregate is something enormous. I have estimated upon very good bases, though necessarily in a general manner, that the 12,000,000 persons at work annually earn 418,000,000*l.*, giving a proportional income per head of about 19*l.* per annum, or 85*l.* 10*s.* per family. The accumulation of capital among the working classes has been very great of late. In 1830 the number of depositors in savings' banks was 17 in 1,000 of the population, and the amount of deposits averaged 11*s.* 3*d.* per head. In 1848 the number of depositors was 39 in 1,000, and the amount of deposit 20*s.* per head. In 1866 the number of depositors was 47 in 1,000, exclusive of the depositors to the Post-office Savings Banks, and the amount of deposits 30*s.* per head, inclusive of the deposits in the Post-office Banks over and above the amount invested in friendly societies, building societies, and co-operative associations. These are cheering evidences of progress, though, indeed, the working classes might accomplish a great deal more, were they more careful and more saving, more persistent in labour, and more economical of their time and opportunities. There is one great source of absorption of the working man's earnings, and that is drink. It is a sad, very sad fact that in the United Kingdom as much as 80,000,000*l.* a year are spent in drink, upwards of 50,000,000*l.* of which, at least, are spent by the working classes! What a large proportion does that constitute of their earnings! Can it be that any one having 25*s.* to 30*s.* a week will expend upwards of 5*s.* a week in drink, and that mostly for the gratification of one individual member of the family, regardless of the limited resources, amounting almost to penury, of wife and children? To say nothing of the evil of drunkenness, that fruitful source of crime, riot, and sorrows without number, is there any comparison between the momentary sensual gratification of drinking to excess and the enduring happiness resulting from a comfortable home? Home! If any of you working men have not got it yet, resolve, and tell your wife of your good resolution. She will aid it all she can. Her step will be lighter, and her hand will be busier all day, expecting the comfortable evening at home when you return. The table will be ready at the fireside; the loaf will be one of that order which says by its appearance you may cut and come again; the cups and saucers will be waiting for supplies; the kettle will be singing; and the children, happy with fresh air and exercise, will be smiling in their glad anticipation of

that evening meal when father is at home, and of the pleasant reading afterwards.

When we speak of our working men, we cannot, indeed, help including our very selves in the great number. Labour is with us a second nature. To forego our duties, to neglect our calling, and to indulge in idleness, would be to accelerate the end of our existence. And we need not be ashamed of our calling, nor despair if it be a lowly one.

> Work, work, be not afraid!
> Look labour boldly in the face;
> Take up the hammer or the spade,
> And blush not for your humble place.
>
> There's glory in the shuttle's song;
> There's triumph in the anvil's stroke;
> There's merit in the brave and strong,
> Who dig the mine, or fell the oak.

SCIENTIFIC AND ART INSTRUCTION.

THE Department of Science and Art have issued an Explanatory Memorandum to accompany the Minute of 21st December, 1867, already noticed in our columns. As respects scientific instruction, it is stated that the payments are only made for the intruction of students of the artisan or weekly wages class, and those whose incomes are less than 100*l.* per annum. The teacher, to be qualified to earn payments on results, must have taken a first or second class, unless he has obtained some University degree. Six royal exhibitions of the value of 50*l.* per annum, tenable for three years, are given in competition at the May examinations. Three of these are to the Royal School of Mines in London, and three to the Royal College of Science in Dublin. Free admissions are given to the courses at these institutions to all who take gold medals. To schools of art held in rooms devoted to art-instruction, the aid consists of the following payments, in addition to others similar to those awarded to night classes:—20*s.* on account of every artisan satisfactorily instructed in art; 15*l.* or 30*l.* on account of art pupil-teachers; 5*l.* or 10*l.* on account of students trained for art-teachers or national scholars; 3*l.* on account of free studentships to artisans submitting advanced works; 10*l.* on account of expenses of annual report and examination. The night-class aid towards art-instruction of artisans in elementary schools in literary, mechanics', or similar institutions, consists of payments of 10*s.* or 15*s.* on account of artisans or their children above twelve years of age satisfactorily taught drawing of the second or third grades; of prizes to successful students; and of payments towards the local expenses of examination.

THE MANCHESTER TRADES' UNION OUTRAGES REPORT.

THE report of Mr. Pickering, Mr. Barstow, and Mr. Chance, has been issued as a Parliamentary paper. It is addressed to the chief commissioners now sitting in London.

The examiners commenced their inquiry at Manchester on the 4th of September last. They found that the members of several of the unions of brickmakers and bricklayers throughout the district had destroyed their books containing the accounts of their expenditure and the minutes of their proceedings. In one case five chests containing books were broken open by order of the commission, but all documents relevant to the inquiry had been removed.

They then proceed to give an account of the cases brought under their notice, commencing with the Stockport Operative Brickmakers' Union. Various accounts are given pointing to acts of intimidation, outrage, and wrong, promoted, encouraged, connived at, and committed by the unionists. These statements were publicly made and reported on at the time. Manchester, Oldham, and Bolton were the other places dealt with. The commissioners find that within the past ten years no masters' association has committed any intimidation or outrage in the district. All the outrages recorded were instigated and sanctioned by the several trades' unions. They were deliberately planned and executed, in furtherance of a system which had for its objects the subjection of both masters and men to the rules of the union, and the destruction of the freedom of labour. When a master had rendered himself obnoxious, a meeting of unionists was held, and if either a resolution or a tacit understanding was come to that an outrage should be perpetrated, the measures for carrying it out were left to the officers, and the funds of the society were available for the purpose. The largest sum which the examiners found had been paid was 20*l.*, and the share which generally fell to the lot of each man engaged in the transaction was 1*l.*, though the amount varied, and was often more. As already stated, many books belonging to the unions were destroyed, but in others the money paid for outrages was frequently entered as "certain expenses," and in others a sum total was put down without any explanation whatever. These modes of making up the accounts seemed to be so well understood that the auditors never objected to them. The books were always open to the inspection of members of the union, and the examiners have no doubt that the expenditure of the money and its object were well known.

POVERTY, DISEASE, AND "JERRY" BUILDING IN LIVERPOOL.

A VERY interesting, though painful, discussion on this subject has taken place at the meeting of the Liverpool health committee. Dr. Trench, the medical officer of health, stated, that in spite of the efforts of the health committee, "jerry"-builders and others managed to evade the laws and erect buildings, hundreds of which were mere living tombs. He also pointed out as a curious fact, that while many of the streets through which the north-west breezes (prevalent at Liverpool) could blow direct from the sea were comparatively healthy, the streets nearest the mouth of the river had been, for the most part, built so as to exclude the westerly wind, and that in those districts fever and other diseases were rarely, if ever, absent. It was, he said, painful to think, that while the town council could vote thousands of pounds for parks, in which the working population could have but very moderate enjoyment, it seemed almost impossible, with the present legal enactments, to purify and cleanse quarters of the town where fresh air, light, and cleanliness were so necessary. He invited members of the committee to accompany him in his tours of local inspection, and if they found his observations warranted, support him in obtaining better sanitary laws. Mr. Robinson, a member of the committee, said it was a painful fact that in Liverpool, the richest port of the United Kingdom, one in every eleven of residents in the parish was in receipt of parochial relief—20,000 persons being out-door, and 5,000 in-door paupers. To return to "jerry"-building, we may add, that this week the Liverpool magistrates fined two builders of this class for building houses without mortar, street-sweepings having been employed as a substitute.

THE SEWAGE QUESTION.

Ipswich.—The sewage of Ipswich, as is the case with the sewage of Norwich and many other large towns, is likely to prove a nuisance to all those connected with the town. At a recent meeting of the Ipswich Dock Commission it was stated that the Harbour Master had reported to the committee that the town sewage sediment had been found in various parts of the New Cut. The basin in the Cliff Bight, which was made in 1865, so as to provide a depth of 11 ft. of water below ordinary low tides, had been reduced in depth to 3 ft. below the ordinary low tides, and had, in fact, become unfit for the purpose for which it was intended. The Town Clerk had been communicated with, and the matter was now reported to be under the consideration of the town surveyor.

Norwich.—A special meeting of the local board of health has been held for further consideration of the contemplated sewage scheme. Mr. Johnson explained that the Board had already sanctioned the expenditure of 21,000*l.* for the purchase of land for the pumping station and for contracts; and that the rest of the estimated cost of 60,000*l.* was made up in three contracts, two for sewers (16,000*l.* each), and the other for branch drains, amounting to 7,000*l.* He also mentioned that 10,000*l.* of the sum would be required for the completion of the northern drainage, and showed that this sum must be expended whether they went on with the scheme or not. He stated that by having it done with the rest of the work about 25 per cent. might be saved, and that his conviction was that nothing but the sewage being taken from the river would satisfy the injunctionists, reminding the Board that not only had they to remove excrementitious matter from the river, but also the refuse and offscourings from the gas-works, manufactories, &c. It was important that the Board should come to a decision that day, because to-morrow they would have an unusually long list of competitors for these contracts, and he hoped the Board would now do its duty manfully. He concluded by moving—

> "That this Board do authorize the Sewerage and Irrigation Committee to negotiate for the loans required for the construction of the sewage works, not exceeding 60,000*l.*"

The motion led to a long and warm discussion, an amendment being moved,—

> "That before proceeding with this scheme, it is expedient that a full representation of the position in which the Board is now placed in reference to the sewerage be made to her Majesty's Government, with the view to obtain their assistance and advice; and that this be done by memorial, followed by deputation."

A large number of councillors took part in the debate, after which the original motion was carried by thirty-four votes to sixteen, so that the scheme will go on without further delay. At some parts of the proceedings the opponents of the irrigation scheme gave expression to their feelings in such a manner as to call for rebuke from the Mayor.

THE STUDY OF SCIENCE MORE THAN RECREATION.

IN reading over in your journal the report of the paper upon "Technical Education" read by Mr. Randall, F.G.S., before the Society of Arts, I was struck with a remark that emanated from him, and to which I must take exception. The paragraph runs as follows:—"He had been made a Fellow of the Geological Society in consequence of his studies in that science, which he looked upon *merely as a recreation*." I am of opinion, personally, that the study of geology and kindred sciences, or, in fact, any study, ought not to be looked upon as merely recreative; neither does it prove so, as I, and doubtless many others, know full well, who have devoted their leisure hours to it.

That it is a recreation I have no doubt, but it is combined with a good deal of downright hard study, which means work, more especially to those who have few or no opportunities of attending lectures and discourses, and whose progress and success depend entirely upon their own exertions. Neither do I think that any one about to commence, or having in view, the study of science, would do so for the sake of *mere recreation*: he would, I presume, have in view some higher, and, perhaps, more worthy object,—a desire to store his mind with facts, to increase his knowledge, to improve his abilities, and with the fair hope that he would hold his own amongst, and perhaps instruct, his fellows; and that it would prove in the course of life of no little benefit, from his superior attainments, if well applied.

Perhaps an illustration, out of many, from my experience may be of interest to some of my own class of your readers.

Some few years ago I was engaged abroad upon a line of railway, and where machinery of any kind was difficult to obtain, costly when obtained, and then only after months of waiting. The limes used upon this line of works were of an aluminous and slightly hydraulic nature, hard to burn and difficult to grind, especially with our imperfect appliances, would not slack like ordinary limes, took but a small proportion of sand, and the works proceeded but slowly. I had been present but a short time, when I one day observed to my superior, who was passing,—by the way, he was a retired officer of the army and of high rank,—it was a pity no limestone could be obtained in the neighbourhood; for it would be a large saving in expense and progress, and not take a much greater proportion of sand. His only reply was, "Ah! my dear fellow, you don't know this country yet: there is no limestone within a couple of hundred miles of here." I, however, thought differently, but said nothing. In a few days I rode to the base of a range of hills distant a few miles, and where I soon discovered a beautiful hard, white, compact crystalline limestone, of superior quality, and afterwards other descriptions of lime. I need

scarcely remark that these were afterwards used upon the works to the benefit of my employers, and therefore to my own. This was not all: the very stone had frequently been observed by my superior,—the officer of rank,—as well as by others; but they had no knowledge of its nature, and if ever thought of, concluded it was quartz, as one of them afterwards said. A similar circumstance occurred when in Wales some time ago.

And now, sir, in conclusion, I think, should any such distinction as suggested by Mr. Randall be conferred upon men who devote their energies to the attainment of excellence in their several branches, these aspirants would surely not devote their energy, time, &c., for the mere recreation. Would they not rather do so for the supposed benefits that would accrue for their superior knowledge, skill, and ability which would result if properly applied? With all due respect for Mr. Randall, such is the opinion of a

CARPENTER.

GREAT LONDON.

FROM a central elevation Caractacus viewed his old domain. He was amazed at the vast expanse of roofs, the many thousand chimney-stacks, all sizes and shapes; pots vomiting smoke; factory shafts; church spires; towering structures; the net-work of railways (like a spider's web); and Old Thames suffering from congestion. He was informed that the population numbered millions! and that there were 4,000 miles of roads. A statistical account was given of our requirements; our progress in arts; *improvements* in war implements for slaying men miles off (science of slaughter); transmitting messages instantly to all nations on earth; that we have peopled new-found lands; conquered ancients, who now bow allegiance to us. "Extremes are here," said he: "riches and poverty, vice and virtue." Our fame is pre-eminent; but all our deeds will not stand analysing. We are mainly fed by foreigners,—steam-agents constantly rushing to and from all quarters of the globe with supplies. In the event of no aid from other climes woe betide us, for then will London fall.

He was sad while speaking these words:—"Degenerated descendants! ye have indeed built a mighty Babel; but it is rushing, crushing, artificial life, with symptoms of decay. I see men perishing from want; others heaping up mountains of *unaccountable* wealth, the fools or knaves! It was not so in my time here. Are there no green fields? Look beyond Streatham-rise, over Stamford-hill from Essex bounds to Hendon. Enough!" he cried; "I am anxious to depart, and thankful I am out of it." His form was wafted through the smoke over (black) St. Paul's.

R. T.

THE DONJON OF COUCY.

SIR,—The account you publish of the Castle of Coucy would lead one to suppose the donjon still retained its vaulted floors and the conjectural ridge-like finish, and, indeed, had suffered nothing serious to its stability. When I saw it about five years ago, there was no vestige of any of its vaultings beyond their twelve carved springers; nor, indeed, could there be, since the mining ordered by Cardinal Mazarin in 1652, as two fissures, a foot wide at top, and descending to the base, would probably have been fatal to the monument ere this, but for the great iron bandages which M. Viollet-le-Duc says the Emperor caused to be placed in 1856, together with the present weather-proof roof, and which encircle it below the great windowed parapet. This grandest of all castles was thus saved from the fate of our grandest English one, that of Corfe, whose superb donjon fell a year ago, in the gale of "the *London*." The magnificent cornice, moreover, of Coucy, though "overhanging both ways," and cut on both sides, as the account should have added, into two tiers of curling leaves, intelligible miles off, is not "about thrice the thickness of the wall." The wall, or rather parapet, is about 5 ft. thick, and the top about 9 ft., perfectly flat when I walked round it, weather-worn, and without the least trace of having ever received another course. It is certainly not the case, therefore, that it "then slopes upward into a ridge," nor do I see that this was at all necessary for the support of the *hourdes*. M. Viollet-le-Duc founds this imagined finish on an old engraving, and says fragments were found, in the fosse, both of this "glacis," and of the four strangely-placed, unmeaning pinnacles, which may have belonged elsewhere.

This monarch of castles has none of the picturesque charm for which British ones are chiefly visited, being, in fact, like the Pyramids, too grandly simple to acquire much picturesqueness even in ruin; but every architect should study it who visits Reims, as he should also the most unique trigon of almost first-rate cathedrals, and their highly-interesting towns, Laon, Soissons, and Noyon, within which, and about equidistant from them, Coucy stands.

E. L. G.

THE ARCHITECTURESQUE.

A CORRESPONDENT in your last number suggests a dilemma with reference to the theory which I ventured to offer in a recent lecture. In reply I need only say that the interpretation of my language upon which it is based is quite mistaken. There is one point raised, however, which is a fair question, and in the present condition of architectural opinion, ought to be fairly met,—namely, the effect of my theory upon the rivalry of Gothic and Classic. My notion is this: if the Architecturesque be a reality of art-essence, then, firstly, all good architecture must necessarily possess it; but, secondly, some architecture may possess something more; whilst, thirdly, other architecture may possess nothing more. Gothic architecture, for example, may owe its peculiar charms to its essential super-addition of the picturesque; whilst Classic architecture may owe its equally peculiar charms to its essential reliance upon the Architecturesque more or less exclusively. But I beg to remark that I have advanced this as an illustration merely, not as a doctrine: I lay no stress upon it; it is no part of my theory. My proper thesis goes no further than the inquiry whether what I call the Architecturesque is a reality or not: if a reality, then I ask my brethren to turn it over in their minds and see whether it can be brought into the form of useful doctrine.

R. K.

A WORKING MAN ON EDUCATION.

SIR,—The *Builder* from its commencement has advocated the social, sanitary, and educational well-being of the industrial classes, and great benefit to them has resulted therefrom; and I feel sure that the various educational movements of the day will have the valued and able support of your journal. The great agitation which is already begun, has produced some fruit, and has awakened a portion of the upper and middle classes from their apathy on this important matter; and at last it is supposed that all who are capable of appreciating the advantages which education confers upon the community, are in earnest to establish a thorough educational system. Nevertheless, some workmen are sceptical as to the reality of the movement, and are indignant at the neglect of this vital question by the governing classes. I confess that to me it does seem that the leading idea of many of them has been, that "ignorance is bliss," so far as the working classes are concerned, and therefore it would be folly to make them wise. And, judging from the debate on the East London Museums Bill, some hereditary legislators think so still. I think education has made some little advance since I went to school, for there neither grammar, history, nor geography was one of the essentials of a workman's education. All I was taught of grammar was to pause at a comma long enough to count one, and so on up to the period, or full stop. I do not remember hearing anything about art or science, and yet at that period an advanced education was taught the poorer classes in the French and German schools. Many intelligent workmen cry out most strongly against the present and past governments. And even now much doubt is expressed as to their ability to comprehend the nature of the crisis, and the wants of the people. I think great blame is attached to all classes, and one is nearly as deep in the mud as the other is in the mire, as up to the present education has been a bone of contention between the so-called educating parties, and between them the masses have been barbarously mutilated. And I am afraid that in spite of all their now professed interest in us, but few of them understand our wants, and our capabilities for learning.

The evils resulting from the neglect of a well-ordered educational system in the past is now bearing fruit. As the majority of workmen in this country take but little notice of passing events, whilst their limited wants of food and beer are supplied, they are content. The trade leaving the country is nothing to them. Technical and general education is with them a matter of perfect indifference—they follow the track their fathers walked in. The want of higher attainments has not been felt; and, even if it had, little or nothing has as yet been done to supply it.

Many of them who can read indifferently will manage to spell through the police-news columns of *Lloyd's Newspaper* on a Sunday afternoon, and then their whole interest in public questions ends. Their houses, as a rule, are in a deplorable condition; and in their most flourishing periods they are but one degree removed from pauperism.

The truth must sooner or later be told of the condition of a large portion of the people in towns and cities; of their ignorance and neglect of everything of an elevating and ennobling character. And I think when their condition is fairly known that it will be evident to the most obtuse and bigoted intolerant that compulsory education is needed, not only to teach the first elements of knowledge, but also to teach the duties and science of life, whereby they will be able to avoid the excesses which every intelligent man deplores. The advantages of a system of education which would give the working classes the means of knowing themselves, and that the improvement of their condition is in their own hands, and by following a proper course they can acquire, if not affluence, comfort and respectability, and so raise the status of their class that the evils which now afflict them would soon be things of the past. Let then the State, for the present at least, provide for the rising generation the means to acquire the principles of knowledge and morality, and the opportunities for retaining that already acquired, and still further strengthening it on their arrival at manhood; and then, instead of ignorance, there will be a reading and a thinking people, who will provide for themselves and their offspring that which will have become a necessity and form a part of their daily existence. The statesmen who are far-sighted enough to sow the seed will reap a rich harvest, and have "an exceedingly great reward."

Already quacks and nostrum-mongers are at work, making capital out of this question. A few evenings ago I was at a meeting. On leaving, a bill was handed to me, headed, "The Technical Education of the People." After giving an extract from a speech of the chairman of the Society of Arts, in support of these views, it stated, "that any system of national education which does not embrace the opening of the British Museum, National Gallery, &c., on the only day when they can be visited by daylight, and without fatigue, by the working classes, would be unsatisfactory, and might be expected to fail in elevating the art-taste of the people." It is therefore a matter of importance that all those who believe there is a great work to be done should at once turn their attention to the "opening of free libraries and museums on week-day evenings." An Act is already upon the statute-book for the establishment of them in every town, and it only awaits sufficient enlightenment to put it in force, and thus give the industrial classes opportunities to cultivate a taste for science and art. Reading for knowledge would soon form a part of their every-day duties; a higher and a better feeling would be created; and the idea of encroaching upon the day of rest and forcing Sunday labour on others would, I believe, soon be scouted by those who now advocate it. The morals of the people would rise with their educational requirements, and the evils which are so prominent would fall before the intellectual advancement of the people.

After writing the above I had some doubts as to whether it was interesting and suitable to the columns of the *Builder*; but, the other evening I attended a meeting at Sion College, on the opening of museums, &c. and I felt that, excepting three or four speakers, the others went entirely so wide of the mark, that I determined to send a working-man's thoughts, in the hope that I should be able to show the working men's wants.

JACK PLANE.

IMPROVEMENT OF GLASGOW.

GLASGOW ARCHITECTURAL SOCIETY.

AT the last meeting of the Glasgow Architectural Society, the City Improvement scheme was under discussion, Mr. John Honeyman presiding.

Mr. Thomson read a paper on the subject, of which the following is a summary:—It is clear that, except in the great thoroughfares, the rate of rent which may be drawn from shops and warehouses depends very much upon the amount of population in a locality, and of course the value of property depends upon the rent. In the most densely populated area in the plan, the superficial space of ground set down to each inhabitant is about 3½ square yards. I have made a diagram showing an area of 352,440 square yards, including surrounding streets, upon which may be accommodated very considerably within the requirements of the New Police Act, a population of 10,224—that is, about 3·63 square yards to each inhabitant—only a small fraction more than in the worst locality. I make it up thus:—There is space in the plan for 112 tenements; those towards the surrounding streets contain 124 shops and 2,272 apartments, which in the lower localities mean houses. These apartments are each over 10 feet square; and allowing 9 feet for the height of ceiling, gives over 900 cubic feet, which by the Police Act provides space for 3 adults; or taking children into account, about 4½ individuals. It will be seen that the plan shows a block of ground 1,068 ft. by 330 ft., having streets for general traffic surrounding it, and subdivided by narrow streets for local traffic only. Keeping in view the statement made by Mr. Stevenson, that the way to secure motion in the air is to make the open spaces unequal, I have shown a leading street 80 ft. wide on one side, 60 ft. on the other, and two cross streets 50 ft. wide each, whilst the sub-divisions or streets are each 32 ft. wide in the middle and 16 ft. at each end. The main feature of the plan is that the spaces are all open at the ends. There is, instead of a continuous line of building towards the leading street, a series of detached tenements of 48 ft. in length, with 16 ft. spaces between. These lead alternately into streets covered overhead with glass, and lanes providing access to coal and dust carts. Glasgow is notorious for the mortality amongst children. These covered streets are intended chiefly as play-grounds for the young, where they may run about under shelter and out of danger from carts and other vehicles. But the warmth which would result from this method of building would be conducive to the health and comfort of all. As to the expense, I propose to build the walls of these roofed streets of 9-in. brickwork, the difference between which and our ordinary stone walls would be more than sufficient to provide for the glass roofs; and as each apartment could be ventilated by flues carried up in the gables beside the smoke flues, no harm could arise from the spread of contagious disease.

ST. PANCRAS SCHOOL COMPETITION.

THE Guardians of St. Pancras have awarded the first premium of 150*l.* to Messrs. Giles & Biven for the best design for the parish schools at Leavesden, near Watford, and have resolved to carry out the plans with some modifications. The estimated cost is 31,300*l.*; and, in lieu of the premium and commission, the architects are to receive 1,000*l.* for superintending the erection of the building. The premium of 100*l.* for the second best design is awarded to Mr. Peek; and the third of 50*l.* to Mr. Manning.

COMPETITIONS.

St. Andrew's, Hertford.—A number of designs have been sent in and examined. Last week a meeting was held for the purpose of making choice of one of them. On a motion to receive a report recommending this, it was moved as an amendment that it be referred to a committee to consider the claim of Messrs. Smith, and to report to a meeting of the General Committee to be held on the 3rd of April. On the amendment being put to the vote, eight hands were held up for it and eight against it. The amendment was declared lost. The original resolution was then put to the vote, with the same result. Lord Cowper remarked that they had now come to a dead lock, and an adjournment having been suggested, it was agreed to adjourn until Friday.

FROM MELBOURNE.

BEFORE he left Australia, Prince Alfred laid the memorial stone of a new graving dock at Williamstown, Melbourne. This dock, now in course of construction, will, when completed, be 420 ft. in length over all, and 400 ft. long on the floor within the entrance. It will be 97 ft. in width on the top, and the entrance will be 80 ft. wide in the clear. At ordinary spring tides there will be a depth of water of 24 ft. 6 in. on the sill at low water, and 27 ft. at high water. The entrance will be closed by an iron caisson. The dock is built of the basaltic stone of the neighbourhood, known as bluestone, and is estimated to cost, when complete, with pumping engines, &c., 185,000*l*. The dock-yard comprises an area of fifteen acres, and includes the present patent slip, which is capable of raising vessels of 2,000 tons; and within this dock-yard workshops for the several trades connected with ship-building will be erected. The works of the dock were commenced in November, 1864, and its completion is expected by the end of 1869. Engineer: Mr. W. W. Wardell, inspector-general of public works, assisted by Messrs. W. H. Steel and A. C. Todd. Contractor for works now in progress: Mr. J. Leggatt. Resident inspector: Mr. H. Woods. After laying the stone his Royal Highness embarked, and bade adieu to Victoria.

GAS.

AT Wilton the price of gas is 7s. 6d. per 1,000; while at Salisbury it is 5s. In Devizes it is 4s. 2d. per 1,000 ft., and at that price the works yield a profit of something like 700*l*. a year.

The Wolverhampton Gas Company have declared the usual dividend of 5 per cent. for the half-year (free of income-tax). The reduction in the price of gas to a uniform rate of 2s. 9d. per 1,000 cubic feet, announced in February, 1867, came into operation on the 1st of October last, but the full effect upon the reserve of the company could not be ascertained until the close of the present half-year, ending 30th June next.

The Richmond Gas Company have declared their usual dividend of 10 per cent., together with a bonus of 6s. 8d. per share, which would itself be about 1,000*l*.

Books Received.

A Treatise on Smoky Chimneys; their Cure and Prevention. By F. EDWARDS, Jun. Fifth Edition. London: Hardwicke. 1868.

THE fact that five editions of this *brochure* have been already called for shows the extent of the evil it is intended to combat. Mr. Edwards wisely makes evident that the causes of smoky chimneys being very various, the remedies are so too, and must be applied intelligently and according to circumstances. The book contains numerous suggestions which may usefully be considered as well before building a house as after it has been found that the chimneys smoke.

The Waterworks of London; and on various other Waterworks. By ZERAH COLBURN and WILLIAM H. MAW. London: Spon.

THE contents of this volume are articles reprinted from *Engineering*. It is divided into three parts. The first gives a detailed account of each of the London waterworks; the second an account of proposed schemes for supplying the metropolis with water; and the third is on waterworks and water supply in other parts of the country and abroad. The whole forms an important volume on water supply, and is illustrated by numerous good engravings.

VARIORUM.

COUNTRY TOWNS, and the place they fill in modern civilization. By the author of "Three Months' Rest at Pau." London: Bell & Daldy. This is a thoughtful and useful volume on the advantages and disadvantages of country town life, and how to increase the advantages and diminish the disadvantages.

"If small towns," says the author, "surrounded by country aspects and elements, furnish so much healthy development for the body; if in this healthy physical development they contain the germ of much healthy development of character; if they are open to a sort of education which unites the advantages of school and home; if the very faults of their habits and manners are on the natural and healthy side; and if they give special opportunities for cultivating the charities of life on one hand, and public spirit on the other,—have we not a warrant for upholding them as the best field for the production of good, sound, human material to fulfil the highest purposes of civilization? We do not want country towns to supply us with very learned, or very scientific, or very accomplished men,—for these are the growth of special gifts and opportunities; but we want something more valuable, men of strong sense and high principle, who will put down evil, allay strife, counsel wisely, and act faithfully in their own little sphere.

Let me add one more to the advantages country towns possess; their happy leisure, their freedom from the crush and turmoil of busier social life,—from its exciting stimulants, its grinding pressure, its dreadful wear and tear. . . . . There is hardly a question which agitates the public,—education, strikes, the social evil, ritualism, relief of poor, &c.,—which does not press upon men in the clubs, and vestries, and committees of a country town; not, indeed, as abstract questions, but as a duty, or the neglect of it. Therefore we are inexcusable if we allow the mental inertness of country-town life to beset us. All have not special gifts of genius, but breadth of sympathy, and a spirit of intelligent interest in things around us, may be cultivated by all.

So with regard to other things. To keep ourselves young in the power of innocent enjoyment, to keep ourselves true against vanity and all forms of falseness, to cultivate courtesy and real refinement, to practise the charities and amenities of life, to serve our neighbourhood and generation,—we *can* do all this; we can thus far shape and complete our character by resolute will and the aid of God's Spirit, and make ourselves wise and true, gentle and valiant Englishmen,—though we may be destitute of polished manners, polite accomplishments, and literary tastes."

Miscellanea.

THE LYNN DOCKS.—The foundation-stone of the wet dock now in course of rapid construction at the northern end of the port of King's Lynn, has been laid. The stone formed part of the sea-wall of the dock. The contractor is Mr. W. F. Lawrence. The stone laid was a large mass of concrete, one of a number of blocks of a similar composition which will be used in the construction of the work.

PROPOSED LUNATIC ASYLUM FOR THE BOROUGH OF SOUTHAMPTON.—The County Asylum getting more crowded, pauper lunatics from Southampton and Portsmouth have been removed from it, and the lunatic commissioners have intimated to the town council of Southampton that they will require the borough to erect an asylum of its own, or conjointly with Portsmouth. The estimated cost of the new asylum is stated at 16,000*l*.

WINDOW FOR GUILDHALL, LONDON.—At the last meeting of the Lancashire Cotton Famine Fund, it was stated that a fine painted window, as a grateful memorial of the generosity of the citizens of London on the occasion of the calamitous famine, and the result of a penny subscription among the cotton operatives, will shortly be set up in the Guildhall. The history of its creation should be placed upon or below it in English, and in letters that could be read by all. Some of the inscriptions on modern windows convey no meaning whatever to nine out of ten of those who look upon them. The last meeting of the Cotton Famine Fund, when it was determined to divide the balance of the fund now in hand, amounting to about 9,800*l*., among the principal towns in Lancashire, in aid of infirmaries and dispensaries *pro rata*, according to population, was presided over by Alderman Cotton. Such coincidences often occur: thus the morning papers the other day, mentioning the attendance of the Prince and Princess of Wales at the Chapel Royal, St. James's, showed that, while the service was performed by the Rev. A. Sitwell, the anthem was "Stand up and bless the Lord."

HORSHAM COTTAGE HOSPITAL.—At a meeting held in the Literary Institution, Horsham, Mr. W. E. Hubbard in the chair, it has been resolved to establish a Cottage Hospital in the neighbourhood; and a committee has been appointed to carry out this object, with Mr. Edward Bostock as hon. secretary.

BEADON'S PATENT DOOR-HANDLES AND OTHER FASTENINGS.—The object of this invention is to get rid of the annoyance and expense arising from defective methods of fixing door-handles. Those attached to the spindle by a screw in the neck of the knob cannot be nicely adjusted or secured. Others which are attached to the escutcheons soon get out of order, because the screws by which the escutcheons are fixed to the door draw out, especially when the wood has been thinned by the insertion of a mortice-lock. Beadon's patent plan adjusts the knob, and fixes it on the lock-spindle between screw-nuts, the escutcheons serving as bearings. They are simple, strong, and cheap, and certainly deserve a trial.

THE WEST LONDON HOUSE PAINTERS' AND DECORATORS' MUTUAL IMPROVEMENT ASSOCIATION.—We are glad to repeat that this association has been started with the idea of imparting to its members a more thorough knowledge of the principles and practice of ornamental decoration and colour. It is governed by a committee of seven members, also a chairman, secretary, and treasurer, and the members meet for the purpose of study on certain evenings. Members of the trade are admitted into the association on the payment of 1s. entrance fee, and a contribution of 1d. per week. The meetings are at present held on Friday evenings, at the St. John's Working Men's Club, Kirkman's-buildings, Tottenham-court-road. Mr. Cave Thomas was to lecture on Fresco on Wednesday evening last.

NEW USES FOR PAPER.—In America, pails, washing-basins, and pans of all sorts are being made out of paper. They are light, particularly cool, and may without injury be placed in an oven till the water in them boils. Greenbacks are not the only evidence of the advent of the paper age in America, therefore. There was lately a "paper ball," in which the dresses were made of paper. Paper collars, cuffs, &c., we suppose, are also to be had in America as well as here, and they are making Manilla broad-brimmed hats of paper. Extremes meet, so do east and west—the Japanese and the Americans. Paper hats and cloaks and paper pocket-handkerchiefs are in common use in Japan, and all our American friends want to complete their paper age is the paper pocket-handkerchief: the paper spittoon they no doubt already have.

A MEETING-ROOM WANTED.—Charles Ashby, a plumber, applied to the Lord Mayor the other day, on the part of some working men, for leave to meet in the Guildhall. He said the recent meeting at St. James's Hall ascribed the existing want of employment to the effects of foreign competition and of free trade, but that line of argument was so manifestly repugnant to the views of many working men present, himself amongst the rest, and the result of the meeting was altogether so unsatisfactory, that they were desirous of having another convened for the discussion of the question, and under conditions calculated to secure a fair hearing on all sides. The difficulty was that all places for public meeting in London were to men like them so costly, and were besides inadequate in size. Mr. Ashby said that he was of opinion that strikes were driving trade from the country, and he was prepared to state the reasons for that opinion at a public meeting. He knew men who, under the existing state of things, worked under a feeling of terror. The Lord Mayor replied they were the more fools on that account. Let them, he said, emancipate themselves forthwith from such thraldom, and work for any master who might be willing to employ them, and at such wages as he might be able to afford. As a rule, no honest man need be under such apprehensions. In the end, the Lord Mayor told Mr. Ashby that he himself could not grant the use of the Guildhall. The privilege of affording the use of the hall for a public purpose lay with the Common Council, and Mr. Ashby left with the intention of applying to them. If he can show that there are a number of artisans desirous of testifying their opinion, and that they have amongst them men capable of conducting such a meeting properly, it is to be hoped that the Common Council will afford the opportunity desired.

NATIONAL PORTRAIT EXHIBITION.—The arrangement of the third and final collection is now making progress at South Kensington. There is no want of portraits; indeed the great difficulty is to find space for those already received. The exhibition will consist of portraits of eminent persons who have lived during the present century, and of many distinguished people who flourished prior to that time, forming a supplement to the whole series. In all there will be about 900 portraits, and efforts are being made to open the exhibition, which promises to be of greater popular interest than its predecessors, on Easter Monday.

FALL OF A WALL AT THE SOUTHERN EMBANKMENT.—Two men, with several others, were engaged in Fore-street, Lambeth, in pulling down several buildings, and carting away the materials, in order to clear away the space required for the Thames (Southern) Embankment, when suddenly a portion of brickwork, about 20 ft. long, was observed to bulge and totter; and, although an alarm was promptly given, enabling the majority to run away, before the two referred to could escape the wall fell, and they were buried beneath the ruins. It was found they were so seriously injured about the head, face, and other parts of the body, as to require their immediate removal to St. Thomas's Hospital, where they remain in a very precarious condition. Several other men were slightly injured by being struck with bricks, &c.

TEMPLE-BAR.—The City architect (Mr. Horace Jones), replying to a question in the Court of Common Council as to the rumours of the alleged insecurity of Temple-bar, said he had brought the matter recently before the City Lands Committee, and received their instructions to make a careful survey of the whole structure. Although he believed it had suffered a great deal from settlements of the fabric at various times, there was nothing of that kind that he could see of recent date. The joints from which mortar had fallen were now being filled in with fresh cement, and no further settlement of the structure had taken place. Mr. Fricker, however, amidst some cheering, gave notice of a motion for the next court, to the effect that the removal of the Bar would greatly facilitate the enormous traffic continually flowing into and from the City, and that the City Lands Committee be instructed to cause the fabric to be removed forthwith.

PANIC IN A THEATRE.—The Rev. R. Stanton, an Independent minister, recently delivered the last of a course of lectures to the working classes in the Sheffield Theatre Royal. The subject was the Todmorden tragedy, and very nearly terminated tragically to a great number of persons. The place was crowded to excess. A cry of "fire" was raised, and a scene of the wildest confusion ensued. Two women precipitated themselves out of the boxes into the pit, falling on to the heads of those below them. Women and men scrambled out of the pit on to the stage, smashing the chairs and music-stands in the orchestra and the foot-lights on their way. Others broke through a skylight at the back of the stage, and dropped from thence into a yard. Some found their way underneath the stage, and, pushing their arms through the grating into the street, besought those outside to smash the grating and let them out, as the place was on fire. There was no loss of life. The alarm of fire was groundless.

SOCIETY FOR THE ENCOURAGEMENT OF THE FINE ARTS.—On Thursday last, Mr. W. Cave Thomas gave another of his series of lectures on painting, the subject on the present occasion being "An Attempt to Systematise the Methods of Oil Painting." Mr. Madox Brown was in the chair. The lecturer said that if the grand style ceased with the neglect of mural painting, on the other hand the revival or discovery of oil painting multiplied pictures; and he next drew attention to the different methods for obtaining transparency of colour and solidity, the former quality being seen to perfection in jewels and in painted glass, which afforded a clue to the painter; and he concluded a very able and scientific lecture with hints as to the employment of pigments, and other interesting particulars. Mr. H. Warren confirmed some remarks of the chairman as to the justness of the principles enunciated, the neglect of which had given rise to some curious pictorial effects, instancing a picture of a man in armour, by Vandyke, over which the artist had painted a man in velvet, in which, however, in the course of time the original picture had reappeared underneath.

NAVAL HOSPITAL FOR JAPAN.—We are glad to find, by the *Lancet*, that the naval estimates include the sum of 25,000*l.* for the erection of a naval hospital at Yokohama. Those who know the insalubrious condition of Hong Kong, the only naval station we possess in the Eastern seas, will appreciate this intention of Government, since Yokohama is as essentially salubrious in climate as Hong Kong is the reverse.

WORKING MEN'S COLLEGE.—A deputation, consisting of the Rev. the Principal F. D. Maurice, Mr. Thomas Hughes, M.P., Mr. Ludlow, Mr. Lishfield, Mr. W. Cave Thomas, and Mr. Jennings, waited upon Lord Robert Montagu to solicit Government aid in carrying out the new buildings for the art classes, museum, &c., at 45, Great Ormond-street. We understand this assistance is likely to be granted.

THE NEWCASTLE CENTRAL EXCHANGE DOME.—This dome was recently destroyed by fire; and the proprietors being unwilling to re-erect it, a proposal to do so by subscription, as it was regarded as an ornament to the locality, has been made, and the town council have agreed to subscribe 120*l.*, and others additional sums, amounting in all to 400*l.* It will be stipulated that the dome be insured; and, if again burnt, that the money be used in re-erecting it.

VALUE OF LAND IN LIVERPOOL.—The Liverpool Corporation offered for sale by auction twenty-nine plots of land suitable for building purposes in the principal thoroughfares of the town. The competition, however, was very slow, and only three of the lots were sold. Although the reserve price was not mentioned, it was understood that in several instances it amounted to 32*l.* per square yard. One of the plots sold was bought by the occupier, Mr. Rigby, publican, for 32*l.* per yard. The other lots were sold for 8*l.* and 7*l.* 10*s.* per yard respectively.

THE ISLINGTON WORKHOUSE.—Some of the parishioners do not feel quite easy about this matter, and express an opinion that scarcely sufficient care was exercised in making the selection. It is said that the buildings, according to the design chosen, will cover 7 acres 3 roods of land! It was stated at a meeting in the parish of St. Pancras the other day, that although the architect's estimate was 30,000*l.* (for 1,000 persons), the alterations made in the plans had brought the amount up to 70,000*l.* The Board should take advice upon the subject before it be too late.

OIL TESTER.—A patented machine for testing the lubricating qualities of various oils is being introduced by Messrs. John Bailey & Co., of the Albion Works, Salford, Lancashire. The apparatus consists of a bed-plate, two pedestals, fast and loose pulleys and strap, fork, two brass steps with weighted levers to produce friction, an indicator to show the revolutions, and a thermometer to indicate the temperature produced. The exact money value of oil may be arrived at as follows:—Suppose a certain quantity of No. 1 oil on the machine shows 200 deg. by being driven 10,000 revolutions; No. 2 oil shows 200 deg. and 7,500 revolutions, or 25 per cent. less value; in addition to this practical way of obtaining a result, the machine may be driven to a higher temperature, to see which oil produces the worst residuum.

FIRE IN THE CITY: SAFETY IN CLOSED DOORS. A fine old mansion in Devonshire-square, Bishopsgate, once inhabited by the late Bishop of London (Blomfield), took fire last week, it is believed in spirit cellars beneath it. The occupier, Mr. Hart, was roused in the middle of the night by his wife, who smelt fire, and having ascertained that the house was on fire, Mr. Hart caused his wife to arouse the female inmates, and himself awoke his wife's father, a man of seventy-two years of age, and conducted him to the outer door, and having left him in the street, carefully shut the door, and ascended to the upper floors, where he found the other inmates already on the roof, and assisted them to a place of safety. Other doors inside were shut, and by the aid of the fire brigade the fire was confined to the one house where it began. The furniture in the drawing-room, and a valuable library, as well as other property, were saved, and the firemen regarded the result as something like an unusual triumph over "the devouring element." It was observed that wherever the doors had been shut the fire had failed to penetrate, even although the doors were blackened and charred. The fine old staircase was completely destroyed.

STRIKE AND LOCK-OUT AT SALTAIRE.—The harmony of this celebrated model establishment has been disturbed by a strike of weavers, who urged their employers for an immediate advance of wages, on the ground that other employers in the district gave higher wages than Messrs. Salt's firm. The firm promised a rise, if on investigation they should find it to be the fact that others gave higher wages; but this reasonable proposal did not seem to suit the views of the weavers, who immediately struck work. Messrs. Salt being offended, and indeed not believing that there was any truth in the assertion of the weavers, shut up their whole establishment, which seems to have brought the weavers to better views, as they agreed forthwith to return to their work, pending the inquiry originally proposed by Messrs. Salt.

TENDERS.

For rebuilding house and shop, Commercial-road, E., for Mr. Colson. Mr. Iron, architect:—

Moyle (accepted)	£247 10 0

For the erection of warehouse, No. 154, Minories. Mr. N. S. Joseph, architect:—

Higgs	£3,948 0 0
Myers	3,871 0 0
Newman & Mann	3,858 0 0
Ashby & Sons	3,729 0 0
Axford & Whillier	3,700 0 0
Ashby & Horner	3,685 0 0
Conder	3,681 0 0
Piper & Wheeler	3,648 0 0
Browne & Robinson	3,624 0 0
King & Sons	3,570 0 0
Hill & Keddell	3,525 0 0
Henshaw	3,498 0 0
Brass	3,485 0 0

For alterations and additions to the Plymouth Workhouse. Messrs. Dwelley & Son, architects. Quantities supplied:—

Elliott	£2,757 0 0
Jenkins	2,629 0 0
Call & Pethick	2,444 0 0
T. Marshall	2,058 0 0
Price	2,029 0 0
J. Marshall (accepted)	1,895 0 0

For building a sixty-quarters malting at Preston, next Faversham, for Messrs. Shepherd, Neame, & Co. Mr. Benjamin Adkins, architect. Quantities supplied by Mr. Thos. M. Rickman:—

Contract No. 1.—Builder's Work.

Stiff	£3,866 0 0
Austen	3,250 0 0
Epps	3,150 0 0
Shrubsole	3,098 0 0
Creed	3,055 0 0
Sollitt (accepted)	2,895 0 0
Goatham	2,875 0 0

Contract No. 2.—Smith and Engineer's Work.

Smyth & Co.	£699 15 0
Drury & Biggleston	665 0 0
Garrett & Co.	649 0 0
Weeks & Son	639 10 0
Spencelayh & Archer (accepted)	616 0 0

For house at Coolhurst, near Horsham, Sussex, for Mr C. Scrase Dickens. Mr. M. Digby Wyatt, architect. Quantities supplied, by John Young:—

	Local Stone.	Add if Ransome's Stone.
Myers & Sons	£6,220 0 0	£210 0 0
Cheel	5,545 0 0	495 0 0
Abrahams	5,174 0 0	491 0 0
S. Simpson	5,319 0 0	288 0 0
Simpson & Son	5,200 0 0	400 0 0
Ashby & Sons	4,995 0 0	460 0 0
Ennor	4,775 0 0	460 0 0
Longmire & Burge	4,849 0 0	373 0 0
Henshaw	4,760 0 0	445 0 0
Ashby & Horner	4,800 0 0	400 0 0
Piper & Wheeler	4,597 0 0	440 0 0

For new warehouse, No. 19, Basinghall-street, City, E.C. Mr. Herbert Ford, architect:—

Turner & Sons	£4,133 0 0
Brass	4,046 0 0
Piper & Wheeler	3,877 0 0
Mann	3,875 0 0
Crabb & Vaughan	3,839 0 0
Browne & Robinson	3,815 0 0
Pritchard	3,740 0 0
Henshaw	3,614 0 0

For erecting two warehouses, Trinity-court, Aldersgate-street, City. Mr. John Collier, architect. Quantities supplied by Mr. J. S. Lee:—

Wilson (too late)	£5,999 0 0
Rogers & Richards	5,190 0 0
Axford	4,985 0 0
Carter & Sons	4,948 0 0
Nightengale	4,943 0 0
Keyes	4,793 0 0
Gammon & Sons	4,717 0 0
Scrivener & White	4,612 0 0
Deards	4,585 0 0
Langmead & Way	4,492 0 0
Crabb & Vaughan	4,474 0 0
Wood	4,389 0 0
Sharpington & Cole	4,339 0 0
Foale	4,035 0 0
Henshaw (accepted)	3,967 0 0

For an oratory, Kensal Green, for Baroness Weld. Mr. Pugin, architect:—

Hill & Son	£350 0 0
Hodgson	290 0 0